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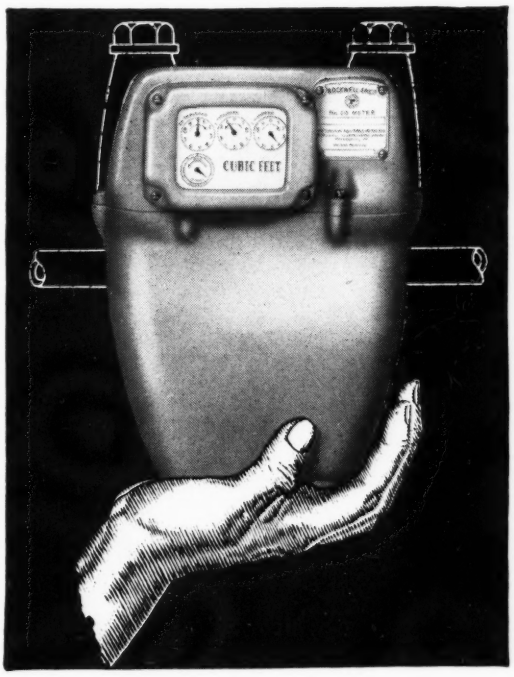

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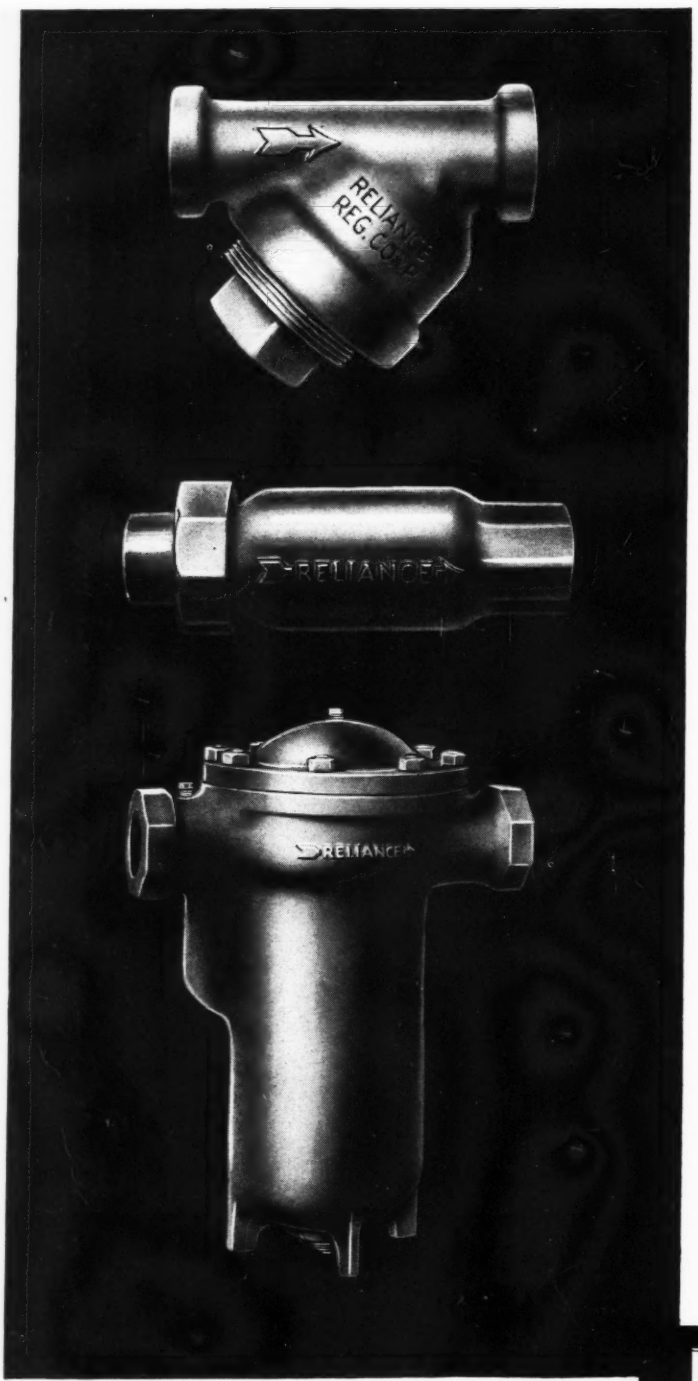

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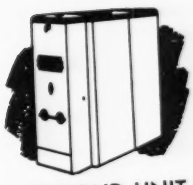

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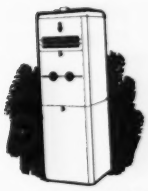

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Thermally Thinking

By ELLIOTT TAYLOR

Adequate Hot Water

THERE was an intrepid quality about the annual natural gas regional sales conference, sponsored by the residential gas section of the American Gas Association and held in Pittsburgh at precisely the time when the eastern natural gas industry wanted nothing in the world so much as less consumption—by several million feet—than its importunate consumers were clamoring for.

It required a stalwart moral physique for any speaker to stand before an audience of gas men and assure them that the sellers' market was over, and that from here on out they would have to get out and merchandise their wares to a selective buying public.

Yet the meeting was held, to the edification and improvement of around 400 sales executives from eastern and midwestern gas companies; the speakers who addressed them all stuck to their story, and the audience believed them simply because they knew they were hearing the truth.

Sales conferences are often prone to sink to the level of emotional pep rallies in which everyone shouts in delirious anticipation of the business he is going to get (he never learns just exactly how), and pounds his palms together in noisy approval of a message that is forgotten as soon as the last sonorous phrase has boomed from the deafening throat of the electrical amplifier.

The Pittsburgh conference was in no sense devoid of enthusiasm, or lacking in histronics—what with Carl Sorby on hand with a brand new pitch and three beautiful stooges in his supporting cast—but in addition it proved to be in nature, as well as in name, a genuine sales conference.

To our way of thinking, the most significant paper presented was that in which W. J. Schmidt, general sales manager of the Long Island Lighting Co. analyzed and presented conclusions regarding the potential effect of the new trends toward automatic laundry machines and mechanical dishwashers on the automatic water heating requirements of gas utility customers.

Sometimes new gadgets that are little more than minor variations of an old familiar product are referred to as revolutionary, although it is seldom indeed that a domestic article rates that sweeping description. But the automatic or cycle type home laundry, and its companion piece of equipment, the gas fired clothes drier would appear to fall within that classification. Certainly the home laundry is not to be regarded as just a variation of the old familiar washing machine. The latter was invented and perfected with the primary aim of helping the housewife do her laundry; the automatic or cycle machine is literally designed to do the laundry for her.

THE implications for the gas industry are far reaching. From the standpoint of water heating equipment, tests already conducted indicate that many water heaters that have heretofore been considered almost adequate for family requirements become obsolete when confronted with the temperature requirements of the new machines. According to a Westinghouse survey: "If users of automatic washers are to get reasonably satisfactory results, they need: (1) Water heaters set to deliver water that is at least 140° F. at the automatic washer, and (2) Water heaters that will deliver 40 gal. of at least 140° F. water in a period of 80 minutes." Thus the necessity for studying the family hot water requirements, and accurately sizing each job in terms of heater capacity, becomes a responsibility of whatever agency sells or recommends automatic water heating equipment. Obviously since its gas load is at stake, that responsibility will have to be shared by the gas utility regardless of whether it actually sells water heaters.

That the principle of automatic home laundering has revolutionary implications is further exemplified by figures quoted by speaker Schmidt as having come from the Bendix Co., one of the most prominent manufacturers in the field. Of all the Bendix washers sold, the company estimates that only 35% replace old style conventional washers, and 65% of the sales are made to people who formerly sent their laundry out to the commercial plants. If these figures are correct, and the manufacturers ought to have a pretty good idea, they mean that 65% of the sales imply a possible need for a new water water, and they also mean that in these cases all of the additional water heating incident to the use of the machine is new load.

Water heating has come far since the days when a little sidearm heater and 20-gal. range boiler were considered good enough by hundreds of thousands of average citizens. The trend to automatic hot water has been under way for a long time. Now the new automatic devices, with the cycle laundry and the clothes drier out in front, point up the need for something more than just automatic hot water—they set the trend and the pace toward a new goal of an adequate, as well as an automatic, supply of this indispensable home necessity.

The Interstate Compact

THE announcement that another four years' extension of the Interstate Compact to Conserve Oil and Gas has been agreed upon by the Interstate Oil Compact Commission's executive committee is so routine that it hardly rates as news. And the reason is that in the 12 years that it has been in existence the Interstate Compact has become so much an indispensable adjunct to, and instrument of, the oil and gas conservation policies of the compacting states, that anything but an extension of its life would be unthinkable.

Its formation in September, 1935, ended one of the wildest periods in the history of the oil industry, marked in public memory by the wasteful orgy of unlimited production which in 1931 flooded the market with oil, and caused the governors of both Oklahoma and Texas to call out their militias to enforce shutdown orders on the producing wells.

It took four years of arduous labor on the part of the governors and industry representatives from many of the producing states finally to draft an acceptable statement of objective and frame a workable compact looking toward its attainment. During their 1935 legislative sessions Colorado, Illinois, Kansas, New Mexico and Texas ratified the compact, and Congressional approval was obtained in September of the same year.

The original compact was a two-year agreement, extended three times until 1943, when the first four-year extension was adopted. The number of compacting states has increased from the original ratifiers to a present total of 18; and although the compact permits any state to withdraw on 60 days notice, no state has ever resigned.

THE power of the compact commission lies not in any legal authority or administrative jurisdiction that it holds over the oil and gas industry, for it is without such powers. The purpose of the compact, "to conserve oil and gas by prevention of physical waste thereof from any cause," is achieved entirely through the voluntary action of the several states, acting on the basis of common investigations and common studies of all matters affecting the oil and gas industry.

The agency through which these investigations and studies are completed is the permanent organization of the Interstate Compact Commission. The compact prides itself that all of the compacting states are trustees of their own natural resources. It might well go further and rightly contend, that it is largely because of the compact that the states, and not some ubiquitous agency of the federal government, are trustees over oil and gas matters within their own boundaries.

Twelve years is not a long time for any association to endure, but its achievements to date bespeak its support by all of the oil and gas states so long as any of their natural petroleum resources remain.

A Need For Speed

NOTHING could have been more timely than the announcement on Feb. 14 that the War Assets Administration had sold the much discussed war emergency pipe lines to the highest bidder, Texas Eastern Transmission Co. of Houston. The week of Feb. 10 had been one of the most difficult and trying periods that the natural gas industry in Ohio, Pennsylvania and some parts of New York and West Virginia ever experienced. A prolonged cold wave had stepped up domestic and other heating demand to the place where supplies to industrial gas customers diminished almost to the vanishing point. The Pittsburgh papers reported that layoffs directly associated with the fuel shortage had resulted in 50,000 workers being temporarily unemployed in that city alone. Additional thousands were out of work for the same reason in West Virginia and eastern Ohio.

Further complicating the problem was the Feb. 12 break in the Tennessee Gas and Transmission Co.'s line which supplies several companies in this area, delaying for another 24 hours or more the resumption of delivery to industrial users.

While the failure or even the momentary interruption of natural gas service cannot be regarded as a desirable thing from the standpoint of either the gas utilities or the gas consumers, there is no doubt that the experience of February will have the effect of shoving the natural gas supply problem into the forefront of political and economic consideration, and that it will make difficult if not impossible the successful employment of the obstructionist tactics that in times past have been so freely engaged in by the coal and the railroad interests.

Within a short time the Federal Power Commission will receive an application for a certificate of convenience and necessity authorizing the purchaser of the Big Inch lines to transport and sell natural gas in interstate commerce. We have heard some gleeful predictions to the effect that the public hearings on this application will be turned into a battle royal between the new Texas Eastern Co. on the one hand, and the applicants for certificates to build rival lines, supported perhaps for their delaying value by the coal and railroad intervenors, on the other.

We doubt that such capricious and shortsighted tactics on the part of the obstructionists would be countenanced by the FPC in view of the grave urgency of getting more gas into the eastern area before the winter of 1947-48. What happened in February of this year is only a mild token of what may be anticipated in another winter, once the supply of domestic househeating equipment reaches the market in a volume comparable to the pent-up demand.

OTHER applications are pending before the FPC for authority to construct new gas lines into the East, over routes somewhat paralleling the Big Inch lines. Memphis Natural Gas Co. wants to construct 1000 miles of 24-in. line from Texas to the Pittsburgh area at a cost of $63 million. And the Trans-Continental Gas Pipe Line Co. wants a certificate authorizing it to spend $130 million on a line to bring gas from Texas to the "Eastern seaboard area." The Texas Eastern operators also have indicated that they may eventually seek to build a new line or lines over the right of way that they will acquire with the purchase of the Big Inch lines.

All of these are projects for the future, and while the several prospective builders of new transmission facilities can in a sense be called competitors, the truth of the matter is that the Eastern market is so big, and the supply of gas in Texas so vast, that there is ample demand at one end, and ample reserves at the other, to justify several new lines. Who should be permitted to build them, and whether in time parallel applications should be considered as mutually exclusive each to the other, are matters for FPC study and decision.

But the *problem* of next winter's supply is imminent even now. Immediate construction of compressor stations and connections to bring the lines up to their maximum deliverability must be undertaken at an early date if they are to be completed in time. The question that the FPC has to consider is not whether or not it will permit natural gas to go into a new market, but rather whether it will immediately authorize the construction of the facilities required to serve the existing market next winter.

Unless the commission is seriously and honestly considering the advisability of stopping any further shipment at all of Texas gas into the East, and is willing to accept the full political and economic responsibility for such a decision, it has no alternative but to grant with all celerity and in complete disregard of the pleas of specious intervenors, the necessary authorization whereby Texas Eastern may bring its newly acquired lines up to full capacity before the 1947-48 crisis descends on utilities and consumers alike.

Highlights

● A threatened strike in oil refineries throughout the West Coast, which would have brought with it drastic curtailments in gas usage throughout the area, was averted last month when the Oil Workers Union, C.I.O., accepted a compromise agreement calling for 10 cents an hour pay raise plus cost-of-living bonus of $17.70 a month. Eighty-eight companies would have been affected.

● Final disposal of the Big Inch lines was made Feb. 14 by the War Assets Administration when it awarded the systems to Texas Eastern Transmission Corp. for $143,127,000. The company, a new firm organized by E. Holley Poe, is expected to take over operation of the lines April 30, the expiration date of the interim lease held by Tennessee Gas & Transmission Co.

● The Memphis Natural Gas Co. applied to the Federal Power Commission Feb. 13 for permission to build a $63,300,000 pipe line from Texas to Western Pennsylvania. The 24-in. line is to be laid in three parts, with the first part, 100 MMcf per day capacity, to be put in operation by April, 1949. It would extend 669 miles from the East Texas gas fields to connect with the Louisville Gas and Electric Co. and the Kentucky Natural Gas Co. systems. The second section would extend 290 miles from Louisville to Clarington, Ohio, and the third a distance of 57 miles eastward to Green county, Pa., 25 miles south of Pittsburgh. The second section would increase the total capacity to 220 MMcf per day and the third to 295 MMcf, the application said. The three sections are estimated to cost $32.3 million, $20 million, and $11 million, respectively.

● Vacating its Jan. 6 order, the U. S. Supreme Court has agreed to hear a case involving jurisdiction of the FPC over prices of natural gas. Interstate Natural Gas Co. is challenging the right of the commission to regulate prices of natural gas produced and sold within the same state before it is delivered to points outside the state.

● Columbia Gas & Electric Corp.'s Charleston and Pittsburgh Groups have filed with the Federal Power Commission applications for authority to construct additional facilities to supply estimated increased requirements in existing markets served by the Columbia companies, including Washington Gas Light Co., The Manufacturers Light and Heat Co., and Home Gas Co. Total cost of the proposed facilities has been estimated by the companies at $25,492,040.

● Panhandle Eastern Pipe Line Co. is contesting in court the November, 1946, order of the FPC which granted Michigan-Wisconsin Pipe Line Co. permission to build a natural gas pipe line from the Hugoton field in the Southwest to Detroit. In taking its appeal to the United States Circuit Court for the District of Columbia, Panhandle has contended that the commission exceeded its authority in approving the proposed new line and that its decision was contrary to the weight of evidence adduced in commission hearings. The commission had overruled Panhandle's objection to the approval. Panhandle now supplies natural gas to Michigan Consolidated Gas Co. for distribution in the Detroit area, and had opposed the proposed Michigan-Wisconsin company's line.

● The much heralded experiment in the underground gasification of coal was started early in February when an army incendiary bomb was lowered into a seam of coal at the Alabama Power Co.'s mine at Jasper, Alabama. The seam, 25 ft. deep, has been isolated and two tunnels driven into it and connected. The coal is being converted into carbon monoxide, diluted with nitrogen. Independent scientists and U. S. Bureau of Mines technicians are studying the results in an effort to determine if a useful flow of gas will be created.

● The application of the Michigan-Wisconsin Pipe Line Co. to construct a $52,600,000 natural gas pipe line from Texas to the Detroit-Ann Arbor area, as well as to various sectors of Wisconsin, Missouri and Iowa, has been approved by the FPC. In making its decision, the commission overruled objections of Panhandle Eastern Pipe Line Co., which serves Detroit, as well as the United Mine Workers, railroad brotherhoods and the National Coal Association.

● Gas range manufacturers have increased production facilities appreciably over pre-war capacity, Harold Massey, assistant managing director, Gas Appliance Manufacturers Association, reports. If the materials situation eases by mid-year, production of gas ranges will exceed the 1.6 million units produced in 1946, he predicted. This compares with the pre-war years of 1936-1940 when sales of gas ranges averaged about 1.5 million units a year. A record production of 2,225,000 gas ranges was reached in 1941. Indications are 1947 production will not exceed the 1941 figure, since manufacturers cannot expect to obtain more steel in 1947 than they did in 1941.

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USES AND ABUSES OF APTITUDE TESTS

By THOMAS M. HARRIS

Harris, Rust & Hawthorne, Personnel Research Consultants, Boston*

THE value of psychological tests in business selection and placement is one of the most controversial questions now being discussed by industrial executives. Almost every sales or management conference schedules at least one session on testing. Violent pros and cons are usually expressed, but cold, factual data are, for the most part, lacking.

A great many executives have, by now, had some experience with tests. Either they have bought tests and used them themselves, or they have employed some consultant to do testing work for them. As a result of these experiences some are rabidly enthusiastic, some are tolerant and skeptical, while others have concluded that the whole testing enterprise is one of the most wasted and futile efforts of the human race. I have no doubt that many of the experiences men in business have had with tests, fully justify all three points of view.

The plain fact is that psychological tests have been oversold on the one hand and undersold on the other. Claims have been made for tests which are exaggerated, false and misleading. The usual sales appeal proclaims that tests can in some inexpensive, simple, and mysterious way solve some of management's most difficult and complicated problems. However, the use of tests is full of hazards in spite of the fact that the gadgets themselves look anything but complex. The really good tests—a very small percentage of the total number available—have been constructed on the basis of careful scientific experimentation. Only persons who are well acquainted with those experiments are equipped to get the benefit from psychological measuring instruments that is inherent in them.

The main point that I should like to make in this article is that tests are potentially extremely valuable to management but that the potentialities of these instruments are, as yet, largely unrealized. The public relations activities of mental testers are partly to blame for this situation. Applied psychologists have sometimes elected to play the role of swami complete with crystal ball and turban. The mental tester is not a fortune-teller; he is a scientific man, and whether or not he can do sound work depends not only on his own qualifications, but also on the cooperation he can get from the business concerns which employ him. The chief trouble with mental testing in industry is that business men have often demanded rabbits out of hats—and many testers have been foolish enough (and sometimes ignorant enough) to try to fulfill this demand.

The kinds of tests that are being used in industry are probably well known to many of the readers of this article but a brief summary may help illuminate some of the points I want to make later on. Broadly, psychological testing instruments are of two kinds: (1) multiple-choice tests and (2) projective tests. The multiple-choice type is the more familiar. In this kind of instrument the test poses a problem or asks a question and the person taking the test records his answer by checking one of the options provided by the test maker. In the case of the well known and fantastically misused "intelligence test" the most common procedure is to present an arithmetic problem or a problem having to do with vocabulary and to provide four or five answers only one of which is correct. The man taking the test has to discover which of the presented answers is the right answer. He may, of course, check one of the wrong answers but it is important to note that he must reply in terms of one of the options presented by the test maker. In this type of test, he is even denied the privilege of making up his own wrong answer. Most of the tests of interest, personality, temperament, social judgment, sales sense and the like are also of the multiple-choice type. Consider, for example, such a typical personality test question as this: "Do you blush frequently?" The person being tested has to answer *Yes* or *No* or perhaps, "*I don't know.*" No space is provided on the test blank for him to explain under what conditions he blushes and under what conditions he does not blush. There is, in other words, no opportunity for him to write how he feels. He has to respond in the "either-or" terms provided by the author of the test. The poor unfortunates who insist on writing after such questions how they feel are usually labeled by mental testers as screw-balls—the scoring system of the test makes no provision for such individualists.

The research work we have done for industrial concerns clearly demonstrates that multiple-choice tests used alone have only a very limited usefulness in the selection, placement and upgrading of business personnel. Multiple-choice tests are chiefly valuable for "screening" purposes. Only when properly used and *only after* adequate experimental work can they be of value in spotting the stupid or undesirable employee. They are almost never useful, except in combination with more advanced types of tests, in pointing out

* Also research fellow in clinical psychology, Harvard University.

"Psychological tests have been oversold on the one hand and undersold on the other. Claims have been made for tests which are exaggerated, false, and misleading." But, thinks the author, "tests are extremely valuable to management," although the "potentialities of the instrument are, as yet, largely unrealized."

Taking to task those executives who expect "rabbits from hats" and those testers foolish enough to try to produce them, Mr. Harris points out the limitations, as well as the benefits, of a scientifically handled testing program.

Mr. Harris has had extensive experience in personnel psychology and related fields during the past dozen years. From 1937 to 1946 he was connected with the vocational guidance department of the Boston YMCA, serving as director the last five years. In 1942 he was visiting lecturer in psychology at Clark University. Since 1942 he has taught at Harvard on personnel psychology and educational measurement. He is at present a research fellow in clinical psychology there.

Since 1939, Mr. Harris has also conducted numerous tests in the gas industry. Last year he organized the firm of Harris, Rust, and Hawthorne, consultants, in Boston.

He holds A.B. and M.A. degrees from Vanderbilt University and an Ed.M. from Harvard.

the applicants who have the greatest promise. There is considerable difference between using tests for "rejection" and using them for "selection," although these two uses are quite often confused. It is not enough to be able to detect the poorest bets. What most business men want is a way of selecting the very best bets.

WE have found that the most useful tests for pointing out the most able applicants are of the "projective" type. Projective tests are not now being very widely used in employee evaluation primarily because there are so few psychologists trained in their use, and because most of these practitioners work in psychological clinics rather than in industry. The projective type test allows a man to respond freely to the problems and situations which confront him in the test booklet and our experience has been that such tests, if properly used, are many times more revealing of intelligence, personality and temperament than any multiple-choice tests of any kind. Projective tests furnish an indication of originality, initiative, drive, ambition and many of the other so-called intangibles of personality which are impossible to measure with the ordinary varieties of tests. Also, certain aspects of intelligence which cannot be measured by standard intelligence tests are revealed by projective tests. The Oct. 7, 1946, issue of "Life" shows samples of some of these tests.

Testing programs are generally most effective if *both multiple-choice and projective type* tests are used. But before either type can be used successfully a careful study has to be made of each individual company's policies and practices. There must be a cooperative "getting-together" of the test expert and the executives in the company who wish to make use of the tests. Each must become acquainted with the way the other's mind works, and the meaning of the words he uses. For example, it will generally be found that what the psychologist means by "intelligence" does not too closely coincide with what the business man means by "intelligence."

Some careful research work also has to be done during the get-acquainted period. It is not enough for the psychologist to perform elaborate statistical manipulations on test scores and rating scales. The serious psychologist must study very carefully just what requirements each job imposes; he must study the human environment in which each man must do his work; he must learn just what standards the company has.

Joint Efforts Needed

The only way to get positive, reliable and important meaning out of tests is for the test consultant and the management of the company to engage in a joint research enterprise in which each checks the findings and observations of the other. All too often the test consultant has been challenged to do a fortune-telling act ("testing the test"), and all too often testers have tried to sell their wares on the basis of this kind of stunt.

It is, of course, possible for a competent psychologist equipped with projective and multiple-choice tests all of which have been *standardized* in industry to make some fairly accurate *general* statements about an applicant without having too detailed a knowledge of the particular firm for which he is writing the report. But even when tests are given by a trained examiner under rigorously controlled conditions, and even when the most accurate types of projective tests are used, the "thumbnail sketch" kind of report has its hazards. The psychologist can never be sure that his words carry the same meanings and connotations to the reader that they carry to him. Also, research findings in one company may not be applicable to another company. The personality trait that passes for "originality" in one firm may cause a man with that trait to be labeled as "too individualistic" in another firm.

PERHAPS the best illustration of some of these points can be found in the work that we have been carrying on for the gas companies in New England.

About six years ago we started some experimental work to see what could be done with tests in the selection of house heating and domestic salesmen. When we started we were using only multiple-choice tests, and the results that we obtained, although positive, were not as good as could be desired. The war interfered for a time with this experimental work but it has been resumed since the war. We are now making a fresh start using projective instruments as well as improved multiple-choice tests developed during the war.

At the time we resumed our experimental work after the war, the research work done before the war provided us with enough data to identify men who were likely to *fail* in gas company sales jobs—but we did not have enough data to spot the men who were likely to become top-notch salesmen.

Men now being considered for sales jobs in gas companies in the Boston area are tested and a brief report, based on pre-war research, is prepared. The test scores of the men who are employed are entered on a master tabulation sheet. After enough time has elapsed for the men to prove their value or lack of value to the gas company, this follow-up information is also tabulated. Our main purpose is to secure test data on each of the men hired, to wait until we have been able to find out how each man has turned out, and then to go back and study our test scores and see which of the tests would have helped us predict the man's success or lack of success. Though simple in principle, such a study involves the use of complicated statistical procedures. Our research will not be completed until a sizeable group of data has been compiled on a large group of men. We are not yet in a position to

say definitely what characteristics are most important for success in gas company sales jobs. We will be in a position to do this when our research is completed.

"Kelley" Report

A short time ago, one of the gas company executives called and said he was considering a young man who might be employed in sales or in industrial engineering. We were asked to give this man a group of tests and submit a report of findings. (I shall call the applicant "Mr. Kelley.") Here are excerpts from the report that we sent the gas company:

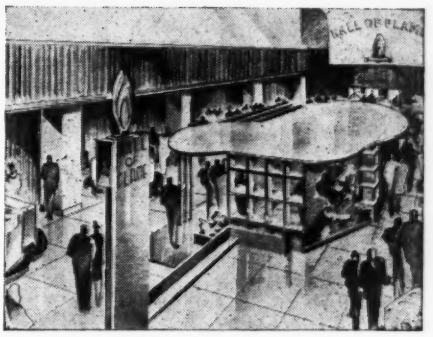
"Mr Kelley's test record is in no way comparable to the test records of salesmen we have so far tested for the gas companies. This is not to say that he would fail as a salesman nor that he would be successful, nor that he would be more effective as an industrial engineer. His test record, as a whole, is not very much like the record of engineers that we have tested . . . Mr. Kelley made outstandingly high scores on two intelligence tests and on a vocabulary test. His scores are higher than the scores made by 98 out of 100 prewar gas salesmen . . . he combines with high intelligence an unusual ability to organize ideas and to see the relationships between them. He is imaginative, and has the kind of mind that puts emphasis on quality of ideas rather than quantity. He will be highly critical of everything he produces and he will always check what he says against the facts . . . Mr. Kelley wants to do something very difficult and complicated. He has a theoretical and abstract kind of mind that likes to view the large aspects of problems. I do not think that he will neglect details but he will always want to see them in perspective. I do not think that he would like ordinary office details very much. He has an unusual ability to keep his mind on many things at one time. He may, indeed, try to do too many things at once . . . although he will try hard to do routine things well, there is, in his record, a certain scorn of the common-place which might adversely affect his work in certain types of jobs . . . Mr. Kelley is inclined to be rather stubborn and he can be expected to be always somewhat dissatisfied with things as they are. On the other hand, he will make a genuine effort to adjust to other people in his environment. He is sensitive to their feelings, yet it seems to me that anyone with a record as unusual as this may be inclined to be somewhat isolated from other people and he will have more than an average amount of trouble in mixing freely and easily on the same common ground with them. . . . Mr. Kelley is so exceptionally able that it seems to me he would be a potential asset in almost any business organization. There is, however, going to be a real problem in tapping his abilities and getting out of him all that he has to offer. Most ordinary run-of-the-mill jobs will not give him enough of a challenge . . . he would, I think, work best in a rather wide-open and individualistic kind of job rather than in a tightly-knit and unchanging kind of job."

More Research Needed

Nothing was said in this report about Mr. Kelley's "sales aptitude" nor about his "industrial engineering aptitude." Although our report may have helped the gas company in evaluating Mr. Kelley's qualifications, the report at no point answered the questions that were uppermost in the gas company executive's mind. Our research in the gas companies had not progressed to a point where we could do any more than give a general evaluation of Mr. Kelley's intelligence, interests, and personality traits. In our report we leaned heavily, of course, on research work that we had done with projective tests in other companies. There are no tests that will evaluate potential salesmen in general and there are no tests that will evaluate industrial engineers in general. A great deal has to be discovered about the characteristics of succcessful men in each company before specific statements can be made.

After our research with the gas companies had been completed we might have been able to add to our report on Mr. Kelley such statements as this: "Mr. Kelley has the kind of originality and persistence which has been found to be characteristic of the most successful salesmen in the gas companies. He can be depended upon to work hard and he will establish excellent personal relationships with customers. He will not be content to remain a salesman of gas appliances very long but he is the sort of person that you can push fast. He has the characteristics of successful district managers that we have tested in the gas company. Persons with his type of record work best when driven with a loose rein. Do not make supervision too tight. Ninety-five percent of the men who have records like Mr. Kelley's have become top-notch salesmen in the gas company."

The only way that specific things can be said in evaluating an applicant by means of tests is after a period of careful research and experimentation in each company.



Lone Star's Sleek Exhibit Is Home Show Attraction

A dramatic feature of the Dallas (Texas) National Home Show, opening March 2, will be the Lone Star Gas Co.'s "Hall of Flame," a 6000 sq. ft. display of the latest gas equipment for the modern household. The Lone Star Gas display, enclosed by walls with a background of royal blue velvet, will spotlight in its center a miniature replica of a cottage containing a complete gas-equipped kitchen. This house will be completely open from the outside so that anyone in the large exhibit area can see the complete interior of the model house without crowding into the inside. This will be a complete modern house with the most ultra modern kitchen featuring all 1947 gas appliances. A room will adjoin the model house where home economists will be available for advice regarding the best methods of cooking and preserving food. Engineering and planning experts of the Lone Star Gas Co. will also be in attendance to give advice and literature to builders and home owners on complete kitchen planning of both the old and new homes.

The front of the display will be marked by a 20-ft. pylon in front of the cottage, topped by a simulated blue flame.

Around the cottage in front of the blue velvet drapes, will be arranged on island bases complete lines of 1947 automatic gas water heaters, gas refrigerators, "CP" gas ranges, all-year air-conditioning plants, and vented house heating appliances featuring central heating plants.

Compact Commission Plans April Meeting in Alabama

A program of special interest to Southeastern oil and gas producing states is being prepared by the Interstate Oil Compact Commission for the spring quarterly meeting to be held in Birmingham, Ala., April 24-26.

This will be the first meeting of the compact to be held in Alabama, which joined the commission in 1945.

RESISTANCE THERM

By ELMER W. HAYES

General Petroleum Corp.

Los Angeles, Calif.

E. W. Hayes

A TECHNICAL exposition of the operation, construction, and maintenance of resistance thermometers is herewith presented by a veteran of 20 years' work in instrumentation and electronics in the petroleum field.

Now with the engineering department of General Petroleum Corp., Los Angeles, Mr. Hayes contributed during the war to the training program, conducting classes in instrumentation for the War Production Training Department. He has also headed industrial classes in radio, motor winding, and electrical winding.

A Missourian by birth, Mr. Hayes received his academic background in electrical engineering at Kansas State Teachers College.

EVERY phase of petroleum processing, from the drafting room, through construction and operation, is in a large way, affected by temperature. One of the oldest, and probably most accurate, methods of measuring temperature is resistance thermometry. This paper is intended to deal with the principles of operation, construction, and maintenance, rather than the glorification of the resistance thermometer or thermohm.

The operation of a resistance thermometer depends upon the variation with temperature of the resistance of an electrical conductor.

Pure metals, when subjected to change in temperature, will have a like change in resistance. There are many characteristics necessary for an industrial resistance thermometer, the most important ones being reproducibility and constancy of resistance and a convenient and simple relation between temperature and resistance.

Platinum in its purest form has the most desirable properties for use in thermohms up to a temperature of about 1000° C. and when the instrument is properly calibrated, it is possible to measure to 0.05° C.

For industrial work, the platinum thermohm is used between —40° F. and 800° F.

Nickel, having a very desirable relation between temperature and resistance in the lower temperature ranges, and being more economical, is used for thermohms in the approximate ranges between —240° F. and +250° F. Copper is also used in the ranges between 0 and 350° F.

Resistance thermometers can be used where the temperature limits are within the suitable ranges, where it is possible to protect the element from contaminating gases and excessive vibration. Most of the above precautions hold true when using other means of measuring temperatures. Since its introduction by Siemens about 1871, and its improvement by Callendar in 1886, the resistance thermometer has been adapted for many uses, including primary standard between —40° C. and +450° C., measurement and control of temperature on aircraft, petroleum processing, air conditioning, refrigeration, and for any service where it is desirable to measure or control temperature to a very close degree of accuracy. Speaking of control, it is possible to indicate a differential temperature with an accuracy in the order of .0004° F. with resistance thermometers.

Construction and Calibration

Resistance thermohms may be constructed in various ways to produce the desired shape, size, and properties necessary for the job at hand. Probably the most common type used in petroleum refining is the 7½-in. platinum thermohm, which is usually made with about 24 in. of No. 39 specially selected platinum bare wire wound on a mica unit about 3 in. long by 5/16 in. in diameter. The unit is built up on two pieces of mica, so arranged as to form a cross. The wire touches only the edges of the mica.

The winding is installed in a manner that will permit the start and finish of the unit to appear in the same general area with respect to temperature gradients to prevent any thermocouple effect and, for like reasons, the extension wires from the platinum unit to the terminal head are made of gold or platinum in the case of a precision standard unit, or of chromal in the industrial unit.

The wire is wound on the cross and spot welded to the terminals placed in

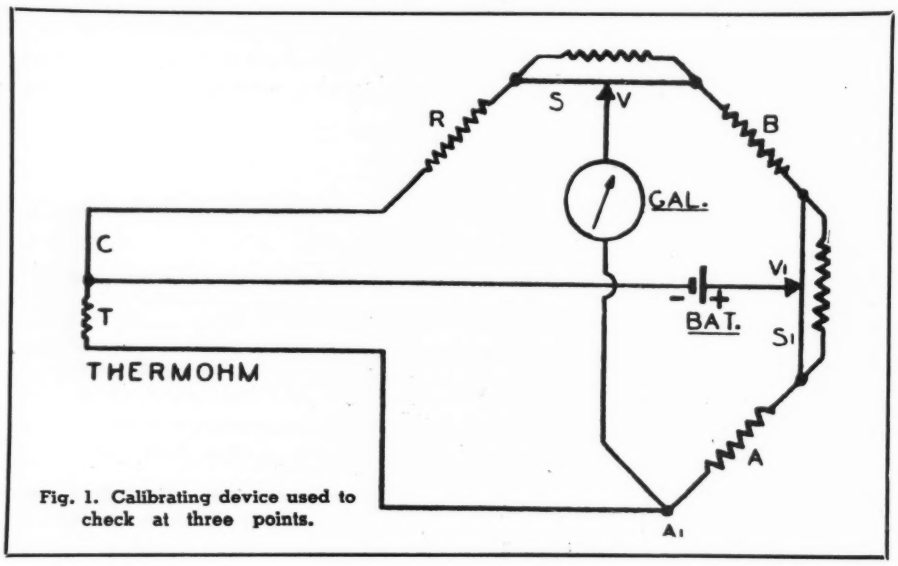


Fig. 1. Calibrating device used to check at three points.

METRY

its protector tube, which is about 3/8-in. o.d. thin wall nickel tubing.

The unit is then placed in a standard steam bath at atmospheric pressure. A reading is observed at approximately 212° F. and compared with the reading of a secondary standard in the same bath. The difference between these readings is recorded and considered as one of the tie points of this unit, with respect to the standard curve. Then the above procedure is carried out in an oil bath near 600° F. and the differential observed and recorded as the second tie point.

The differential at 212° F. is, say, 35° F. minus and at 600° is 50° F. minus. This indicates that the unit being calibrated must be made shorter by cutting out a small piece of platinum wire in the unit, about 1/8 in. Then the above tests are repeated and additional cuts are made until the differentials are equal at each tie point. This means that we now have the curve for the unit being calibrated parallel with that of the standard unit, but approximately 41° F. minus. This differential will vary between 30° F. and 60° F. depending on the characteristics and properties of the platinum being used.

In order to shift the curve on the unit being calibrated so that it will match the standard curve, it is necessary to place a short length of manganin (Zero coefficient) wire in series with the thermohm. This resistance is adjusted to make the unit read the same as the standard and is usually silver soldered to the terminals on the inside of the terminal head, there being four terminals, one for each of the A, B, and C legs of the thermohm and one for the pad coil, so that the differential may be determined at any time of future calibration. This two point check serves very well for thermohms used in the middle temperature ranges. Where accuracy is needed throughout the full range, the practice is to calibrate at three points, ice point, steam point, and the boiling point of sulphur.

ADVANTAGES IN USE OF RESISTANCE THERMOMETER

1. It can be designed to have a greater accuracy than other types of temperature measurement.
2. Greater distance is allowable between instrument and thermohms than with the direct expansion types.
3. Lower temperatures can be measured than with the pressure type thermometer.
4. It can be used effectively in the range of normal ambient temperatures where the thermocouple is not dependable.
5. It is not critical to normal changes in operating voltage.
6. It requires no cold junction correction.
7. Cost of copper leads is less than compensating lead wire.

DISADVANTAGES IN USE OF RESISTANCE THERMOMETER

1. Thermohm has a high initial cost.
2. It is affected by excessive vibration.
3. Platinum absorbs metallic vapors when operated at high enough temperature to show color—approximately 900° F. This alloys the platinum and changes the calibration. In this it is similar to any platinum thermocouple, and if protected by proper ceramic tubing a thermohm may be used at elevated temperatures.
4. Extra precautions are necessary in the extension lead wires.

These calibrations are made with a Leeds and Northrup resistance bridge, using two slide wires so arranged as to give a constant one-to-one ratio. *(See Fig. 1.)*

The slide wires "S" and "S_1" rotate together on the same shaft, their resistance so proportioned by the contacts "V" and "V_1" on the slidewires that a constant one-to-one ratio is obtained on the two arms of the bridge. The resistance of the arm "VV_1" is always equal to the resistance of the arm "V_1A_1". The bridge is brought to balance by rotating the slides until the resistance arm "VRC" is equal to the resistance of "T" (the thermohm). With this circuit, the resistance of the leads from "R" to "T" and from "A_1" to "T" have no effect on the reading as long as these leads are of equal resistance.

Reading Unaffected

As the contacts "V" and "V_1" are not in the measuring circuit, contact resistance at these points will have no effect on the accuracy of the reading. Likewise any normal variation in battery voltage will not affect the reading.

This method of measuring temperatures is desirable in many cases, as it is possible to design the bridge so that the full scale range is in the order of 20° C. and operating over such a narrow range it is possible to measure and control to a very close degree of accuracy.

The general principle of measurement is the same with all resistance thermometers; however, there are various types of instruments used for measuring the change in resistance of the unit.

The potentiometer method is one where the resistance is expressed in terms of a standard resistance, the ratio of which will depend on the ratio of the potential drops across two resistances when carrying the same current. *(See Fig. 2.)*

In this circuit the variation of resistance of the connecting wires has no effect on the accuracy. Due to a constant current being necessary, this method is not used as often as the balance or bridge method.

The deflection method may be used in unbalanced bridge circuits with reasonable accuracy, or in a circuit where the thermohm is placed in series with a galvanometer and regulated battery voltage. However, when the deflection method is used one must depend upon the accuracy of the current driven movement of the galvanometer and in the case of the null method of reading, as in the balanced bridge and potentiometer types, the reading is taken at zero current, which seems to be the most widely used system.

Installation and Maintenance

The instrument should be installed in a location where it is reasonably free from dirt, oil, and excessive vibration. The connecting wires to the thermohm should be pulled in a conduit in a careful manner so as not to change the resistance of the wires during installation, all splices should be carefully soldered, as a change of resistance in the order of 0.018 ohms will mean one degree error in the case of the 10 ohm platinum thermohm de-

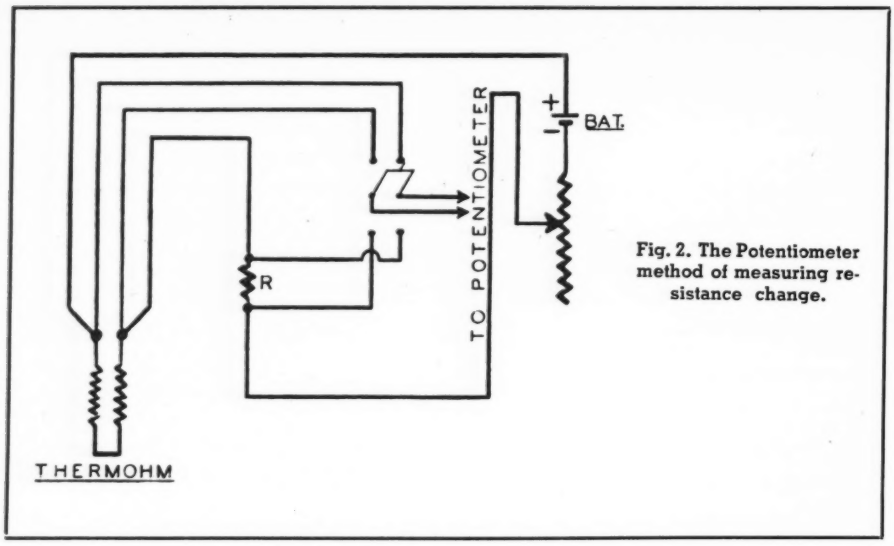


Fig. 2. The Potentiometer method of measuring resistance change.

scribed above. The Siemens three wire method of compensation allows lead wires of considerable length. This system employs a bridge of constant one to one ratio, the "A" and "B" leads to the thermohm, being, in actuality, extensions of the bridge arms. If both these leads are of the same resistance and are pulled in the same conduit so that they have common changes in resistance, due to temperature changes along the conduit run, the circuit conditions have been complied with. Such leads can be extended without changing accuracy but with a loss in sensitivity which can be compensated for by raising battery voltage. Battery voltage should, however, be low enough that the current through the measuring coil will not generate enough heat to affect the calibration.

Check Lead Wires

The lead wires may be checked at the time with a standard check coil designed to work with the instrument to be used. It is connected to the thermohm end of the circuit and a reading taken with the instrument. It should read the temperature indicated on the check coil if the "Z" and "B" legs of the circuit are of equal resistance. If it reads high, it means that the "A" leg is higher in resistance than the "B" leg. This, of course, is true if the instrument has been checked with the check coil connected directly and found to be correct.

In some cases, you will find that two of the three wires will be of equal ohmage and the one that is off can be used for the "C" leg. If this is not the case, then after one has proven to himself that he is not padding an intermittent circuit, he may proceed to pad the "A" or "B" circuit with manganin wire to make them of equal resistance. There are few cases where it is necessary to pad very much, when care has been exercised in the purchase and installation of the wire.

Use of Check Coil

The instrument and circuits may be checked periodically with a check coil, which will detect worn slidewires, faulty circuits, and lack of sensitivity.

This check coil is a non-inductive coil wound with manganin wire to an ohmage that meets the specifications for a designated temperature within the range of the instrument being tested.

Multipoint instruments of resistance type have selector switches that are operated either manually or by motor-drive. These switches must be kept clean and well lubricated by a clean non-corrosive oil as this switch will normally switch the "A" and the "C" circuits, and any change in contact resistance here will introduce an error in the readings.

A spare point on the instrument connected to a check coil will serve as a continuous check on the overall accuracy of the instrument.

Courtesy Southern California Meter Association.

How Replacing Machines May Save Money

By W. F. SCHAPHORST, M.E.

DO you operate an engine? Pump? Compressor? Fan? Do you know what its efficiency is? Is it an old machine? Can you buy one that is more efficient? If so, at what cost? And how much can you get for the present machine?

Those are questions that the reader can probably ask himself to good advantage, and if he can work out the answer he may find it well worth while to buy new or better equipment.

Consider pumps, for example. The average annual cost of power for operating the average pump is greater than the first cost of that pump. Is that true in your instance? Or, perhaps it applies to some other machine.

Assuming that yours is a pump, let us say that its efficiency is 60%, which is not at all unusual, and you find that you can buy a pump having an efficiency of 70%. (There are pumps having higher efficiencies, to be sure.) Now, assuming that these two pumps are driven by motors of the same efficiency at the load required, and that the output of the pumps in theoretical horsepower is 42 hp, you will find that the present pump requires a motor which is 10 hp greater in size than would be the motor required to drive a pump of 70% efficiency.

To work this out, divide 42 hp by 0.60 and you get 70, the present horsepower required. Then divide 42 hp by 0.70 and you get 60, the horsepower required by the more efficient pump, which amounts to a saving of 10 hp, because 70—60=10.

Now let us say that the pump operates 24 hours per day and that your power costs one cent per horsepower-hour. If the pump operates continuously 365 days per year, the power saving by installing the more efficient pump will amount to 10 hp x 24 hr. x 365 days x 0.1, or $876 per year.

Maybe your pump or other machine doesn't run continuously. If it operates only one-half of the time, the saving will amount to $438 per year. Or, if the pump operates only one-fourth of the time, the saving will be $219. A saving even of $219 per year may make it worth while to install a new pump, because you will find that $219 is equal to the interest on $2650 at the rate of 6% per year.

Efficiency can therefore be very important in many instances, as above. It is a good plan to delve into these matters every once in a while to determine whether or not you can make valuable savings by discarding inefficient machinery and installing in its place something that is more efficient.

SAFETY AND THE HUMAN MIND

ANYONE with a broad sense of time and events realizes that life is a hazard. Every kind of activity in which man engages involves some degree of risk, even sleep, for as Mark Twain observed, "Bed is the most dangerous place in the world. More people die there than anywhere else."

Except for what we interestingly call "acts of God," such as earthquakes, hurricanes, and tidal waves, all accidents, I believe, are caused by something going wrong in someone's mind. Poor boiler design leading to an explosion would be an example. So would somebody's "taking a chance," or "showing off," or making an indirect, subconscious attack on himself or someone else—an act which is commonly called "carelessness."

But accidents are costly in time, in money, and in happiness.

From the point of view of time, aside from the 20,000 people who are killed in industrial accidents each year (and whose lost hours are incomputable), there are two million lost time accidents annually in the United States, which cost 32 million lost man days. This is approximately 15 wasted days per man injured.

Huge Accident Costs

From the point of view of money, the wage loss alone adds up to $620 million not counting what might have been earned by those who are killed. The actual cost is probably four or five times as great, for in addition to the lost earning power and such direct expenses as workmen's compensation, legal and medical care, or damaged equipment, there are indirect costs. These are by far the largest part of the loss. They include the lost time of other employees, the demands on the foreman's time, the expense of hiring and training employees to replace the severely injured men, disrupted production schedules, impairment of community good-will, and the lessened skill of the injured employee when he returns to work.

From the point of view of happiness, consider the 20,000 homes to which the news of sudden and unexpected death has to be carried each year. This is something most of us try not to think about. And there are another 100,000 people who suffer permanent injury, varying from total disability to the loss of a finger.

Combination of Factors

Most of these injuries result from the unhappy combination of a physical hazard and an emotional (often called a mental) error. There are the mechanical or the material defects. There are the unsafe acts *and the reasons for them*. By eliminating either, injury can often be avoided. It could certainly be avoided wherever both can be eliminated.

According to the United States Department of Labor there are about six times as many accidents due to an unsafe act as there are due to mechanical or material defects. The Department of Labor also says that an unsafe act is very evident from the consequent injury, but that wrong mechanical arrangement is not so easy to identify.

"Carelessness" Not a Cause

FROM my point of view, as a student of human emotions, it is not the wrong act that matters, but the motivation behind it. This is certainly more difficult to perceive than a mere mechanical defect. Suppose a woman catches her hand in a press with serious consequences. No mechanical defect is apparent, and no logical reason for the act comes to light. "Carelessness" says the accident report. This is based on the naive assumption that "carelessness" is a cause instead of a word to hide our ignorance of the real cause. Perhaps the truth was that the entrance to the women's toilet is located in a conspicuous place, easily observed by the male workers, and this particular woman has many inhibitions against advertising her need to perform natural functions. She can hardly be expected to react to such a situation with imperturbability. Result: restraint, discomfort, distress, inadequate attention, accident.

Accidents are caused as a result of something going wrong in somebody's mind; in this case the architect's mind, management's mind, the woman's mind, and probably also the minds of some of the rest of us.

Obviously the trouble does not always originate in the mind of the person who sustains the injury. The difference can be quickly seen from a tabulation *(Table 1)*.

A person who never made a wrong move could operate a hazardous machine and never be hurt, unless the machine failed, or someone else pushed him. But the physical hazard seems to me far easier to analyze and to control than the emotional hazard . . . which is unpredictable and difficult to observe.

Only the Means

Because of the difficulty of perceiving emotional hazards, we give as the cause of accidents such explanations

By F. ALEXANDER MAGOUN

Associate Professor of Human Relations
Massachusetts Institute of Technology

"(Unsafe practices) are called careless, but I ask . . . 'WHY didn't he hook his safety belt?' 'WHY was he in too much of a hurry to use the guard?' . . .

"Is it unreasonable to suppose that workmen are subconsciously guilty of deliberately causing accidents as a means of escaping from a job they dislike, or of asking a domineering foreman to be more sympathetic, or of rebelling against being required to learn some new habit pattern, or of providing an excuse for some failure?"

In raising these issues, the author points up his theory: that, although "I have searched in vain for a study of accident frequency as an index of employee morale . . . I have a conviction that where accident records are complete and honest the correlation would be unmistakable . . ."

One solution, then, is to raise employee morale; and the way to accomplish it is to establish conditions within a plant that will foster cooperation by the employee.

For even the emotionally mature employee, says the author, cannot cooperate for long unless psychological requirements for cooperation have been fulfilled. A four-point plan for setting up such a program is explained by Mr. Magoun.

In addition to his position at M. I. T., F. Alexander Magoun is president of Human Relations, Inc., which has offices in Boston. During the war he served for a time as consultant to the United States Department of State, and also as advisor in the placement of engineering officers for the Radiation Laboratory Liaison Office of the navy. In 1945 the Society for the Advancement of Management gave him an honorary membership. He has served as special assistant to the personnel director of Yale University and is a consultant in human relations for the New England Confectionery Co., the Stanley Home Products, Inc., Stop and Shop, Inc., and others.

Since 1930, Mr. Magoun has given courses on human relations at Massachusetts Institute of Technology. He has lectured on this subject at 28 universities and colleges, including Yale, Cornell, Lehigh, Worcester Tech, the University of Washington, Oregon State, and Purdue. For 15 years he has given evening courses for industrial executives in various cities.

Mr. Magoun is author of "Balanced Personality" (Harper, 1943), and of several other books, as well as of many articles, including "The Personnel Director and His Post-War Job," "Principles of Disciplining" (both in "Personnel" for 1945), and "How the Foreman Can Help the Veteran" ("Factory," 1946).

as "failure to wear goggles," or "lifting with the back instead of the legs." These things are never the cause of the accident. They are only the way in which the accident took place: the means, the device, the pattern. The cause is what led to not wearing the goggles or to lifting with the back.

Physical Conditions

There are, of course, accident-causing conditions, both physical and emotional; and accident-causing activities, both physical and emotional.

Physical, accident-causing conditions are easy to identify, and consequently are much talked about. They include such things as:

1) Poor housekeeping
   a) Unclean floors, windows, and stairs
   b) Disorderly aisles or work spaces
      Accumulation of goods in process
      Loose material out of place
2) Machinery improperly safeguarded
3) Improper maintenance of buildings and equipment, such as
   a) Elevator cables
   b) Nails protruding in the floor

EMOTIONAL, accident-causing conditions are something else again. One hears little about them, and yet I believe that in any thinking that is alive and accurate they will be recognized as the principal cause of trouble. If the three-year old will bang his head on the floor, almost to the point of self-injury, as a means of securing his mother's sympathy and assistance when his father has been acting the tyrant; if a 20-year old will commit suicide on the doorstep of the girl who refused to marry him as a subconscious method of expressing anger and revenge; if a neurotic will persist in lifelong habits of unhappiness, in order indirectly to express hate against his parents in the form of "look what you've done to me!" . . . if all these things are true (and any psychiatrist will tell you that they are), is it unreasonable to suppose that workmen are subconsciously guilty of deliberately causing accidents as a means of escaping from a job they dislike, or of asking a domineering foreman to be more sympathetic, or of rebelling against being required to learn some new habit pattern, or of getting attention at home as well as in the factory, or of providing an excuse for some failure?

Have you ever noticed that it is the losing football team that usually sustains the injuries? The man with a sprained ankle receives sympathy instead of blame for losing the game.

In New Haven a year ago an old employee was told by the personnel director that in June he would be retired on a pension because of his age. "But I don't want to retire. I want to die with my boots on," he said. These were his exact words. In May the old man was struck and killed by an automobile while on the way home from work. "Accident," said the police and the registrar of motor vehicles. Was it?

I have searched in vain for a study of accident frequency as an index of employee morale. Perhaps no true correlation exists, but I have a conviction that where accident records are complete and honest the correlation would be unmistakable.

There are many emotional, accident-causing conditions. Monotony must be the cause of many disastrous short-cuts. So are improper piece-work rates. Surely many a lonely man has suffered a painful accident just for the sake of being tenderly cared for by a pretty nurse. The psychoanalysts know that every man stands trial in the court room of his own conscience and no guilty man is ever acquitted. As a result we subconsciously punish ourselves again and again—sometimes by having what appears to be an accident.

Unsafe Practices

As for physical, accident-causing activities (usually called unsafe practices), there are many, such as: off balance positions, reaching where one cannot see, incorrect posture, interference between adjacent operations, reaching for a moving object, and horse play entered into to reduce monotony or as an indirect and therefore disguised expression of resentment against another person. All of these are called careless, but again I raise the question, "Why didn't he hook his safety belt?" "Why was he in too much of a hurry to use the guard?"

Activity comes from the whole man: not just from his hands or his feet. All activity stems from some sort of motivation, and all motivations are emotional. Was the cause of the accident the hope of gaining attention by showing off? Then why was the man starving for some attention? Was the cause not keeping his mind on his work? Then where was his mind? On the quarrel he had with his wife at the breakfast table? These are the emotional, accident-causing activities, behind the physical activities which we so often list as causes.

In the texts on accident prevention I find adequate recognition of hazards resulting from chemical explosions, and discussion of their prevention. I

find almost nothing about the hazards of emotional explosions, or their prevention.

NO routine procedure can produce the best results in accident prevention. These can only be achieved by:

1) A sincere desire on the part of top management to improve human relations as well as safety in the organization, and a willingness to spend the necessary time as well as money to accomplish this objective.

2) A wise choice of competent men to advise and assist in the task.

3) A sufficient demonstration of competence — both in knowledge and presentation—by those who advise and assist, to receive (because they deserve) the confidence of both management and employees.

4) A careful study by these consultants, working with the particular management, of the best ways and the most effective means of giving the particular company a better capacity to work as a cooperative team.

5) A patient carrying out of the plan with flexibility enough to make readjustments when needed.

On the human relations side, top management should realize that all behavior can be divided into four classifications. Men either:

1) Fight
2) Give in
3) Run away
4) Cooperate

Every normal person does all of these things under appropriate circumstances. He knows what, for him, is worth fighting for; when to let the other fellow have his way; circumstance under which avoiding the issue is the wise course; how to cooperate in the great majority of situations. In an emotionally healthy life, each procedure has its value.

But the emotionally upset person is driven by compelling forces within himself, which cause him to adopt one of the first three patterns most of the time. These forces stem from a fear of helplessness, or a fear of being humiliated, which result in a rigid pattern of behavior entirely lacking in the flexibility required to adapt to varying circumstances. Consequently the person may:

1) Habitually fight to be the top dog, because he feels secure in a hostile world only when he has power over other people.

TABLE 1—CAUSES OF ACCIDENTS

Causes Originating in the Workman's Mind	Causes Originating in Someone Else's Mind
Poor judgment	Poor judgment
Disobedience	Wrong instruction given
Forgetting	Poor employee selection
Inattention	a) Physically unfit
Haste	b) Emotionally unfit
Taking a chance	Interference with the workman
Tiredness	a) Physical
Emotional upset	b) Emotional

2) Habitually give in, because he feels too helpless to fight, and hopes by being subservient to appease those who seem to threaten him.

3) Habitually run away, because he feels too weak to fight, and yet cannot accept the humiliation of giving in.

Naturally these types of behavior also occur in a variety of combinations, for like the chemical elements, human characteristics seldom occur in pure form.

The emotionally mature person will want to cooperate most of the time, but he cannot do this for long unless the psychological requirements for cooperation have been fulfilled. With many executives, the desire for a cooperative organization is often nothing more than a desire for the benefits of a cooperative organization — not for the discovery and establishment of the factors which are prerequisite. Executives must be brought to realize that the benefits of cooperation stem only from the establishment of the conditions which bring about cooperation. These seem to me to be:

1) The great majority of those involved must have a self-respecting status.

Self respect has to do with one's attitude of respect toward one's self. Self-esteem has to do with what a person thinks is the attitude of other people toward him. The self-respecting person does not feel inferior, even though he is not perfect or as talented as some others. He tries to do what is his appropriate best under whatever the circumstances happen to be, and realizes that neither God nor man can reasonably ask for more.

2) The great majority of those involved must have a continuing and a healthy understanding of how what-they-want and what-they-do affect, and are in turn affected by, what the others do and want, in every situation as it arises.

This requires open channels of communication in many directions and no refusal to express honestly what one is feeling. People cannot isolate themselves from one another and still have mutual understanding. Yet loss of understanding is the point at which cooperation first breaks down. The sure feeling that each person's legitimate wants will be given consideration and reasonable satisfaction, without the necessity of fighting for it, is a long step toward cooperation.

3) The great majority of those involved must have confidence in the availability of and the effectiveness of good methods in working out acceptable solutions for the inevitable disagreements which arise.

More than anything else, this means that each side of a controversy, particularly the one responsible for the decision, is genuinely looking for the truth—no matter how disagreeable—rather than merely trying to secure power. Actually, of course, everybody has power (even the little child has I-won't-power). What matters is how it is exercised. Differences of opinion are of great value insofar as they stimulate new thinking. They are destructive insofar as they result in loss of emotional unity.

4) The great majority of those involved must accept mutual responsibility for results.

Each man's troubles are, therefore, part of the larger problem of running the organization. He should know where he fits into the picture and why, as well as how he can best contribute to the excellence of the final result.

These things, I believe, are in fact just as much a part of accident prevention in an industrial plant as are goggles, or guards, or white lines to define what should be clear passageways. And like most other fundamental things, they are also far more than that.

Presented before Third Annual Safety Conference, The New England Gas Association, Boston, Dec. 10, 1946.

At left, O. W. Graham, one of the authors, measures wall pipe thickness of an 8-in. pipe with the Penetron.

THE PENETRON

Its Application In The Gas Industry

By B. I. DIKMEN and O. W. GRAHAM

United Engineers, Tulsa, Oklahoma

IN the past few years operators in high-pressure gas fields have encountered corrosion on the inside surface of producing and distributing equipment, in some cases to such an extent that material failures have followed. Necessity for detection of the presence and the amount of such corrosion is becoming increasingly important to the gas industry.

Corrosion has been occurring on equipment, both inside wells and on the surface, as well as in distributing lines.

Corrosion on the inside surface of tubing strings has been a major cause of concern since a number of strings have dropped as a direct result. The amount of reduction in tubing wall thickness is determined by pulling the pipe and making examinations on the surface, or by using mechanical calipers while the pipe is still in the well.

Surface equipment has failed from the same cause. It has been determined in many instances that corrosion was the source of trouble on the interior surface of Christmas trees, flow wings, meter runs, and field lines. The established and almost universally accepted method of determining corrosion or pipe wall reduction is visual examination and physical measurement by calipers. Although this procedure was quite simple near flanges and unions, difficulty was encountered when internal examination was attempted on welded connections, loops, and long field lines. Measurement was made through use of the time-consuming, expensive process of cutting into selected sections for examination and then plugging, patching or welding, involving a number of manual and mechanical operations and subsequent inspections.

A fast, accurate method of inspection by use of penetrating gamma rays has found immediate application in these cases.

Perhaps the most recent method of inspection to be adapted to the examination and inspection of gas and oil equipment is the Penetron.

This new method (or device), which has been used for some time in refinery inspection work, utilizes the gamma ray to determine with a high degree of accuracy not only the wall thickness of pipes and vessels, but also to determine liquid density, fluid level, and the interface between two liquids

O. W. Graham

A NEW and promising instrument for use in the fight against corrosion of pipes is the Penetron, a device which utilizes the gamma ray to determine wall thickness of pipes and thus gives indication of the progress of corrosion with what is claimed to be a high degree of accuracy. Liquid density, fluid level, and the interface between two liquids can also be determined without access to the interior of the containing vessel, according to the authors.

O. W. Graham, specialist in thickness measurements by the use of gamma rays, was reared near the Panhandle Field in Texas. He gained considerable experience in electronic testing and communications work while employed by the Western Electric Co. In 1942, while with the Texas Co. in Houston, he began laboratory research work which contributed to the development of the Penetron.

B. I. Dikmen, of Turkish descent, holds degrees from Tarsus College and Roberts College, both in Turkey, and received a master's degree in engineering from Yale in 1942.

Both men were formerly associated with Engineering Laboratories, Inc., in Tulsa, and have now established themselves in that city under the name of United Engineers.

B. I. Dikmen

without requiring actual access to the interior of the containing vessel, and without injury to the material being inspected. More important is the fact that only one side of a pipe or vessel need be accessible to obtain a measurement, regardless of the metal used in construction.

According to operators who have had gas well equipment checked by the Penetron, the method has a number of desirable advantages as a means of determining the extent of generalized inside corrosion. The Penetron measures the average thickness over an area of approximately one square inch.

THE use of the Penetron requires no preparatory work at a well where equipment is to be examined, nor is it necessary to shut the well in. The equipment used is light, compact, and rugged, weighing approximately 40 lb. and is readily portable by hand. As used in the field the Penetron equipment consists of a detector head, weighing approximately 3 lb., attached to a flexible rubber-covered cable leading to a control case, which contains the electronic equipment. This equipment requires 110 volts, A.C.; where 110-volt current is not available, a small gasoline engine-driven generator can be used. The instrument can be placed in operation in a few minutes. A reading of wall thickness requires only one minute.

In order to measure the wall thickness the detector or "tangential head" is placed on the pipe as shown in *Fig. 1.* The head contains a 1 mg. radium source placed at one end and a gamma ray detector with a pre-amplifier at the other end.

Some of the gamma rays pass through the pipe wall to the detector, the number depending upon the thickness of the wall. The tangential head is so designed that the thickness is taken at a point of tangent. This arrangement gives the average thickness over a small area, instead of the sum of the two wall thicknesses. The current discharge or pulses produced by the gamma rays striking the detector are increased in magnitude by a pre-amplifier, then transmitted through a cable (maximum 100 ft. in length), which connects to the control box where they are amplified again. The pulses are then rectified to supply the d.c. voltage to the meter circuit. Any variation in the pipe wall thickness is reflected on the meter on the front of the control box. By means of a conversion chart the meter reading is automatically converted to wall thickness in thousandths of an inch, with an accuracy of plus or minus 3%.

Assuming an actual case of an initial Penetron survey, refer to the data sheet, *Fig. 2.* The determined inspection points are indicated by letters of the alphabet. The original thickness of the 2-in. nipples of the Christmas tree is .436. At point (I) the four readings are .435 on the top, .438 on the right side, .435 on the bottom, and .436 on the left side. The variations in wall thickness at point (I) are within mill tolerance. However, at point (E), where the original wall thickness is .436 inches, the four readings are .385, .350, .340, and .338. The variation from the original wall thickness is not within mill tolerance, hence corrosion or wear is present. The remaining inspection points are checked by the Penetron in the same manner and the presence or absence of reduction in wall thickness detected.

Pipe wall thickness of meter runs, flow lines, loops, and some Christmas tree connections have been measured by this method. The average wall thickness measured by each reading has been used in determining the need for retirement of specific equipment from service. A retirement wall thickness is generally established at a point where further use in pressure service below this allowable minmum is considered hazardous.

Inasmuch as corrosion occurring in high-pressure gas equipment is unpredictable, it would appear to be good practice to make periodic Penetron inspections of gas pressure equipment in the field or plant. These measurements should be made as early in the life of the equipment as possible in order to establish original wall thickness at given check points. A subsequent measured thickness at a given point compared with an original Penetron-measured thickness will determine the loss of metal immediately. This procedure is superior to comparing results with the nominal thickness, inasmuch as mill tolerance allows 12½% wall thickness variation.

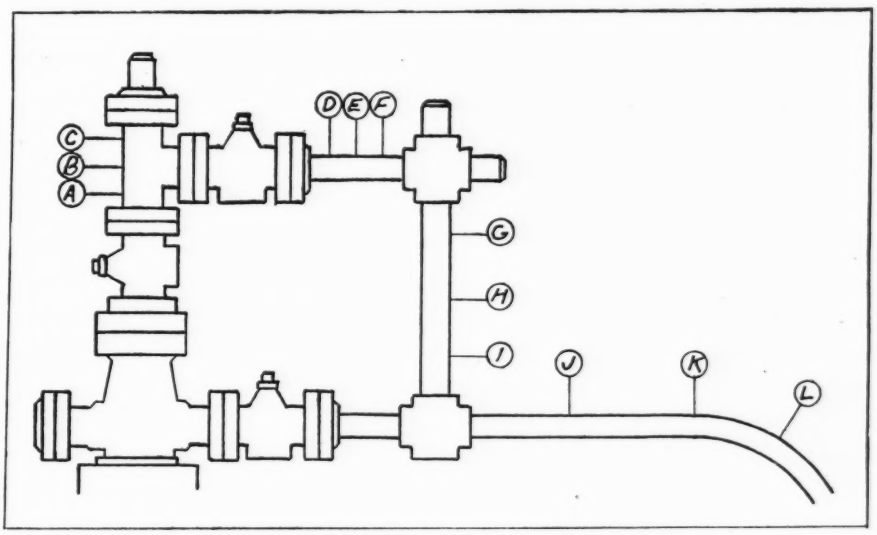


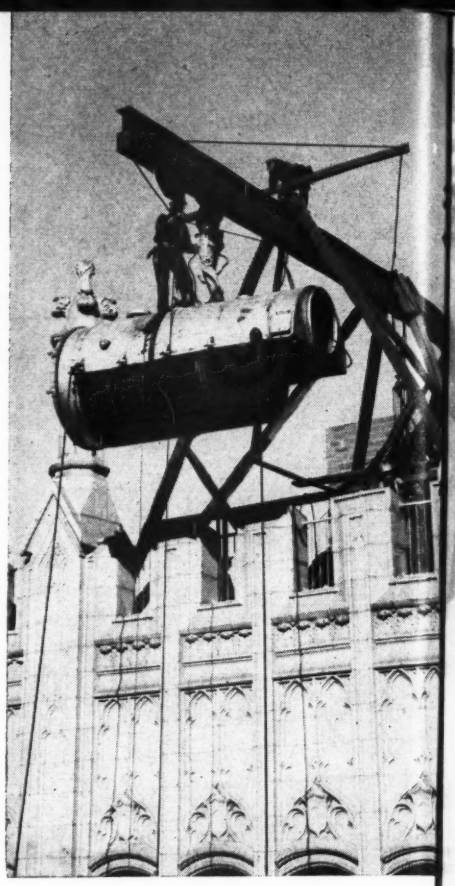
Fig. 2. For reference, see data chart on next page.

PENETRON

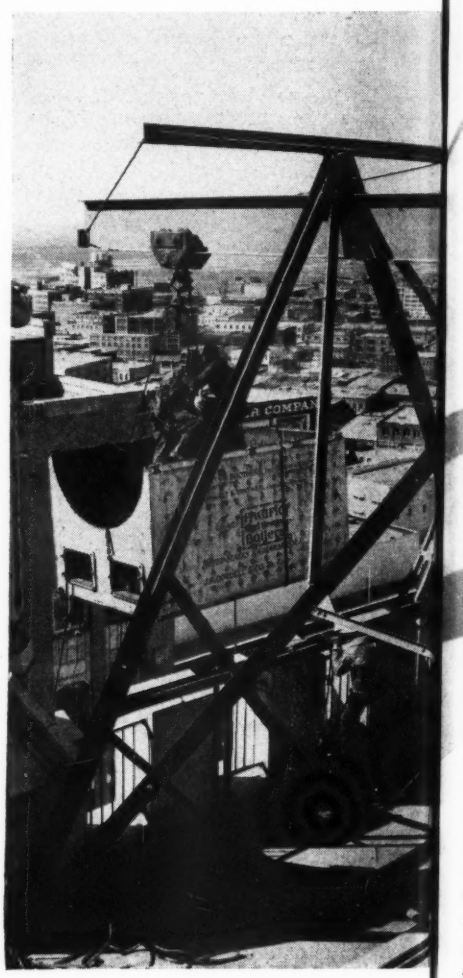
Wilco Producing Co., Bleigh Gas Field, Texas State Lease, Well No. 18

Inspection Point	Penetron Thickness, Inches	Nominal Thickness, Inches	Nominal O.D., Inches	REMARKS
A				
Top	.595			
Right Side	.590	.600	3	Well flowing at 2000 pounds pressure during inspection
Bottom	.600			
Left Side	.605			
B				
Top	.600			
Right Side	.595	.600	3	No thinning indicated
Left Side	.605			
C				
Top	.595			
Right Side	.600	.600	3	No thinning indicated
Bottom	.605			
Left Side	.590			
D				
Top	.400			
Right Side	.395	.436	2	Thinning indicated
Bottom	.365			
Left Side	.372			
E				
Top	.385			
Right Side	.350	.436	2	Thinning indicated
Bottom	.340			
Left Side	.338			
F				
Top	.375			
Right Side	.360	.436	2	Thinning indicated
Bottom	.344			
Left Side	.342			
G				
Top	.380			
Right Side	.382	.436	2	Thinning indicated
Bottom	.375			
Left Side	.387			
H				
Top	.395			
Right Side	.400	.436	2	Some thinning indicated
Bottom	.402			
Left Side	.410			
I				
Top	.435			
Right Side	.438	.436	2	No thinning indicated
Bottom	.435			
Left Side	.436			
J				
Top	.340			
Right Side	.345	.343	2	No thinning indicated
Bottom	.342			
Left Side	.340			
K				
Top	.342			
Right Side	.345	.343	2	No thinning indicated
Bottom	.340			
Left Side	.339			
L				
Top	.320			
Right Side	.325	.343	2	Thinning indicated
Bottom	.330			
Left Side	.320			

Fig. 2. A typical Penetron corrosion survey. Inspection points are designated by letters of the alphabet. Readings are taken on the top, right side, bottom and left side of horizontal pipe with the surveyor facing upstream. Vertical sections of pipe are reported as if they are horizontal extensions to the connections to which they are attached. **(See. p. 35.)**



BARREL of the 16,000-lb. boiler reaches the top of the 18-story Kirby Building in Dallas.



WORKMEN BOARD the firebox and prepare to roll it on trolley down beam onto roof.

Boilers In "Belfry" Heat 18-Story Building

THE highest installation of boilers ever made took place in Dallas, Texas, Feb. 9, when two Pacific steel heating boilers with capacity of 24,290 sq. ft. of direct steam radiation each were placed atop the 18-story Kirby Building. These boilers were manufactured by the Pacific Steel Boiler Division of the United States Radiator Corp.

This unique departure from ordinary heating techniques was necessitated by the history of the Kirby Building, which originally was constructed adjacent to and long was dependent upon the Adolphus Hotel for waste steam. The two buildings were built by the Adolphus Busch brewery interests in 1913, and in the Adolphus Hotel was installed an electrical generating plant which supplied both buildings with electricity and steam. In addition, water for both buildings was obtained from artesian wells drilled beneath the hotel.

Recently, the electrical generating plant was displaced and the Kirby Building management was forced to turn to public utilities for heating, electricity, and water.

The problem of heating presented many difficulties. The rental value of the Kirby Building basement was such that boilers could not be installed there, nor could they be placed in a sub-basement, because not only did it not exist, but it proved completely impractical to excavate.

Zumwalt and Vinther, consulting engineers of Dallas, were called in to work out a solution. They found that the roof was the only available place to put the boilers, as in addition to the basement difficulties, no chimney had been installed when the building was originally built.

First choice for fuel in the Southwest, with its innumerable oil fields, is natural gas, which could be piped to the roof of the 18-story structure without difficulty.

The basement condensate pump is used to return condensate from the basement to the roof. It is of the regenerative turbine type directly connected to a 5-hp motor, and furnished with magnetic starter and hand-off automatic switch. The condensate pumps in the penthouse are of the vertical type with receiver, and were installed with top of basin 6 in. above the finished floor of the penthouse, with the receiver projecting into the attic. Each has a rating of 40,000 E. D. R. and the two pumps are arranged as a duplex unit with receivers cross-connected near the bottom.

The condensate pump in the basement starts and stops under control of a float switch installed on the side of a former air receiver converted to a condensate receiver. Condensate pumps in the penthouse are controlled from water level control switches installed on the boilers. The wiring is arranged in such a way that either boiler can be electrically switched to control either pump or both pumps simultaneously.

The receiver of one of the penthouse pumps is provided with a ½-in. float control installed in the attic near the bottom of the vessel to admit make-up water. The make-up water is obtained from a domestic cold water supply main in the attic, but the tap was brought above the penthouse floor and valved.

In operation, the boilers can be filled by means of a manual line. Level is maintained by the float switches on the boilers as long as water is available in the receiver. Should sufficient condensate not accumulate to satisfy the demands of the boilers, the water level in the receivers will fall until the float valve opens to admit the deficiency.

The greatest difficulty the engineers faced was that of hoisting the boilers, both in the initial installation and in case of possible future replacement. The engineers turned to Pacific Steel because the Pacific boiler can be disassembled into base, firebox, and shell, and can be reassembled on the job without services of a welder.

Each of the No. 6781 Pacific steel heating boilers is adapted to gas fuel and has a capacity of 24,290 sq. ft. of direct steam radiation. Each boiler has a heating surface of 1429 sq. ft., and was built for 15 lbs. working pressure and in accordance with ASME code. The boilers were set on fire brick flatways which were placed on top of a layer of 4-in. hollow tiles that were arranged end to end to permit passage of air flow.

The centrifugal water system weighed more than any other item, but it, too could be disassembled, so that there was no problem in hoisting it. The boilers each weigh approximately 16,000 lbs., and are more than 13 ft. long by 5 to 6 ft. wide, and 10 ft. high. The heaviest disassembled part was the 10,000-lb. shell.

A demountable structural steel frame, involving a 24-in. base beam extending over the street to a distance of about 12 ft. from the main building was constructed. A trolley was attached to roll along the beam and to support the hoisting cables, with power in the street below.

Since the Kirby Building was constructed without a chimney and because construction of one was impractical in view of the factors outlined above, the boilers would have nothing to afford natural draft for combustion. Instead, the contractors installed on each boiler an induced draft fan, connected with its suction side to the boiler flue gas outlet and its discharge side to a flue vent through the roof. They also installed electric wiring for control.

Each fan is adapted to high temperature use by the application of high temperature ball bearings and heat flinger with ability to handle 3600 c.f.m. of 500° gases at a total pressure of 1 in., and with an outlet velocity not exceeding 2000 f.p.m. Each blower was furnished with variable pitch V-belt drives, three phase constant speed squirrel cage motor with enough horsepower to operate the fan.

Martyn Brothers, Inc., were heating and plumbing contractors on the job. Before the installation, steam from the Adolphus Building was made to approach the Kirby Building underground, running under the basement floor to pipe shaft and was distributed in the attic to downfeed heating risers.

As a result of this arrangement, all radiation equipment in the office building,except the toilet risers, was removed and replaced by a new system.

In the old system of heating, there was an unused air receiver standby in the basement. This air receiver was connected to a condensate receiver. It was disconnected and the air piping was removed. After all accumulation of scale and dirt were removed, it was connected to a vacuum pump, and the suction of the basement condensate pump was connected to the receiver, and its discharge was connected to the second condensate pump receiver in the penthouse atop the roof. The old system of bypasses directly from the return system to the sewer and from the old vacuum pump discharge to the sewer were maintained.

The new heating system embodied steam and return mains that are free of sags and pockets, and were installed with an even grade of ½ in. in 10 ft., except that on the fifth floor ceiling the steam was installed with its flow line dead level.

DELAYED COKING UNIT

At The General Petroleum Torrance Refinery

By RANDAL MAASS and R. E. LAUTERBACH

General Petroleum Corp. of California, Los Angeles

WITH the diesel engine, the household burner, and the light oil cracking units all competing for the intermediate or gas oil fractions, the general trend in refining is toward a more extensive cracking of the residuum fraction. It has been estimated[1] that this trend, in the next 10 or 20 years, will reduce the percentage residuum from the present 26% to some 10%. It is not expected that this cracking of heavier stock will so much replace light oil cracking as that it will provide the requisite charge stock.

[1]Hulse, S. H., Oil & Gas Journal, June 15, 1946, p. 93.

THIS PAPER on the delayed coking unit presents a new development in petroleum refining which, it is believed, will be of considerable interest to the gas industry because it contributes to the present trend toward a more extensive cracking of the residuum oil fraction to produce light oil products. From one point of view, it may threaten to reduce the availability of heavy carbureting oil while increasing the supply of light oil for household burners. However, it may also point the way to obtaining high gas yields from low grade gas plant feed stock.

The distinguishing feature of this development is the degree of cracking and the production of light constituents that is obtained by delaying the formation of coke until the charge reaches a soaking chamber wherein the coke is deposited; and the unique mechanical arrangement for removing and disposing of the coke. Essentially, this latter operation consists of dislodging the coke in the "coke drum" by high pressure water jets through specially designed "reamers" and "cutters," crushing it to small size, and removing it by and depositing it from a stream of circulating water.

The General Petroleum Corp. has contributed to this trend by installing a 15,000 B/D Delayed Coking Unit to process 300-700 in. SSF/122° F. straight run residuum. The gas oil thereby obtained will serve to supply part of the feed stock to the four TCC Units. The coking unit was designed, engineered, and constructed by the M. W. Kellogg Co., and incidentally is the largest unit of its kind in the world. Coking operations were started July 26, 1946, culminating a successful and relatively simple startup operation.

It is the intent of this paper to describe the coking process with particular emphasis on the equipment therein. Some of the initial operating data are also included.

General Process

The description of the general process may best be followed by referring to the flow sheet, *Fig. 1*. The cracking portion of the coking unit is divided into two sections each with its own furnace and pair of coke drums to be used alternately. The cracked products from the two cracking sections enter a common bubble tower for fractionation into an overhead product of gasoline and lighter, three gas oil draw products, and a bottoms recycle product. The straight run residuum charge, or reduced crude charge as it is also called, is introduced into the bubble tower for further fractionation with the bulk of it appearing in the bottoms for furnace charge. Three steam strippers for the sidedraw streams and a gasoline debutanizer complete the fractionation equipment.

Physical Equipment

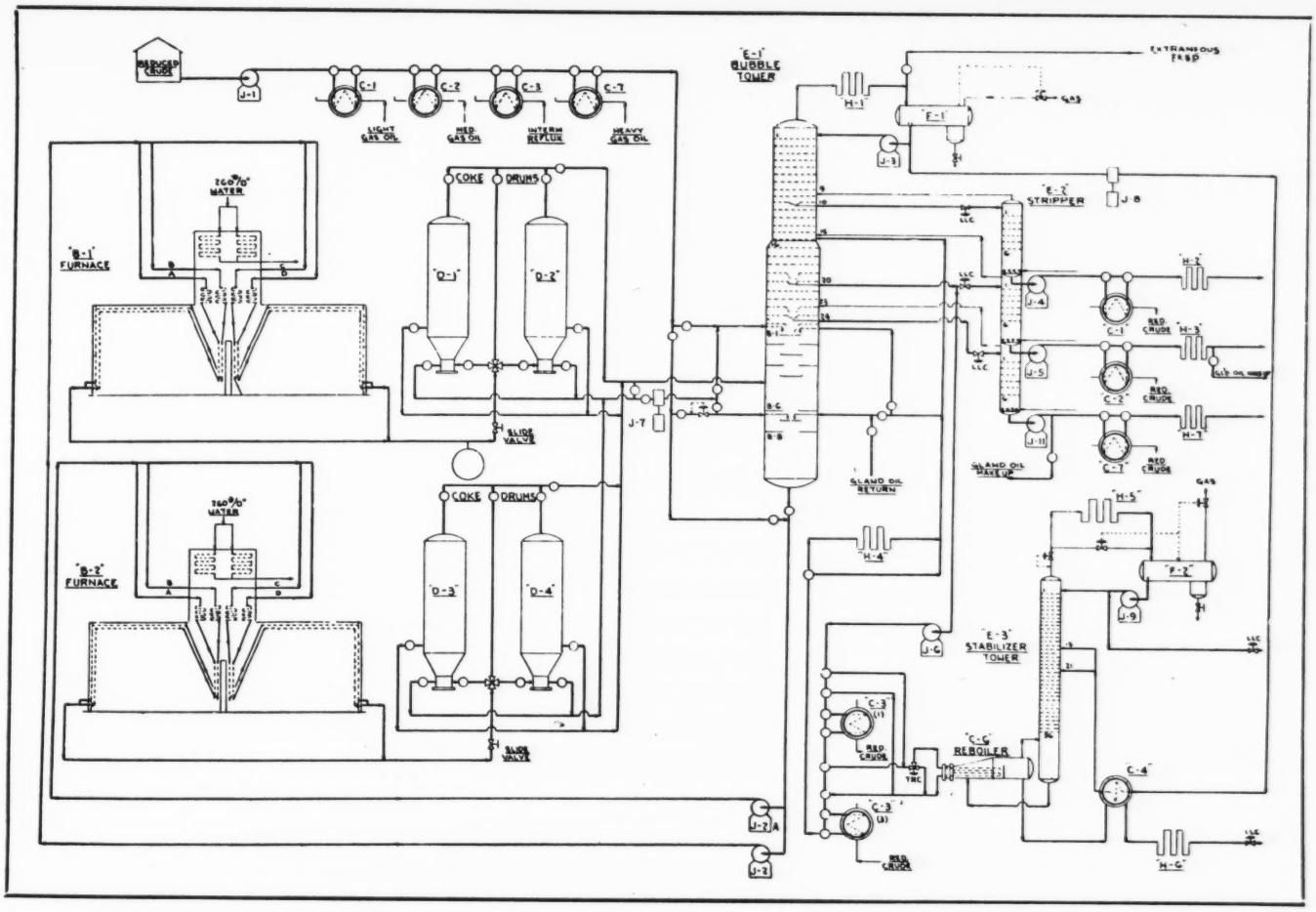
Furnaces—As was indicated above, two duplicate furnaces have been provided, one for each pair of coke drums. The distinguishing and highly desirable feature of a delayed coking unit is the delaying of the coking until the charge reaches the soaking chamber (coke drum). To accomplish this the furnaces are designed for a low residence time and consequently a high rate of heat pickup. Because of the high heat level (600° F.) of the furnace charge, the oil tubes were restricted to the radiant section and the hotter portion of the convection section. Heat economy is realized through the use of water tubes for steam production in the colder portion of the convection bank.

In general each furnace has four separate coils which join outside the firebox into a common transfer line. The 3¼ in. O.D. tubes are 42 ft. long and have a wall thickness of 7/16 in. Alloy tubes of 9 chrome - 1.5 moly are used in the radiant section and to shield the convection bank. The remaining tubes in the convection bank are 5 chrome - 0.5 moly. Heat is supplied by 16 Zink combination oil and gas burners located in the end of the firebox.

Waste Heat Boiler—As was indicated above, the temperature of the furnace charge was too high to realize a good heat economy with oil tubes alone. Therefore, a waste heat boiler, with its lower receiving temperature, has been added in the convection bank of each furnace to reduce the temperature of the flue gases. This heat pickup serves to supply some 75% of the plant's steam requirement. The outlet of the coils from the two furnaces enters a common steam drum from which a single boiler feed pump takes suction to circulate the water through both coils. A level control maintains the water level in the drum by admitting treated water from the refinery main boiler plant feed pumps.

Coke Drums—A continuity of operation is maintained through the use of a pair of coke drums for each furnace, one drum being in coking service while

This paper was originally presented before the California Natural Gasoline Association.

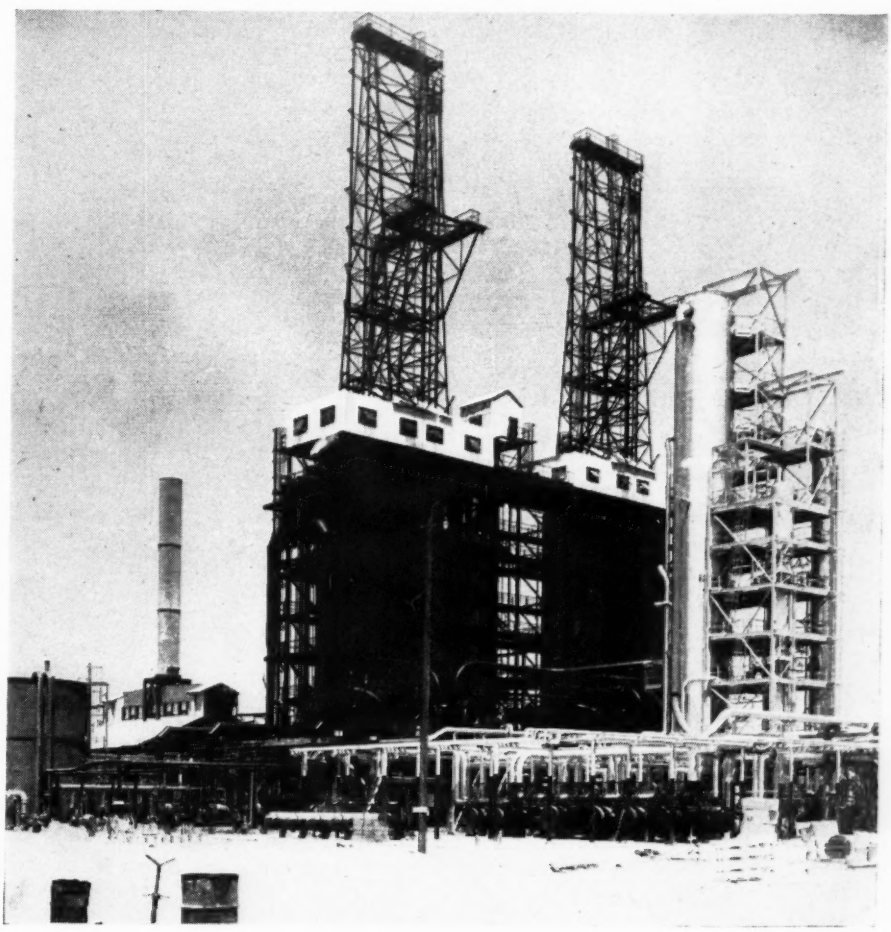


Figs. 1. and 2. Flow sheet of process; general view of drums and fractioning equipment.

the other is being decoked. Each drum is 17 ft. in diameter and 80 ft. in height with 61 ft. of straight section. For protection against corrosion the vessels are lined with a 7/64-in. thickness of Type 405 stainless steel, the lining being resistance welded to the shell. In addition the upper half of the shell is 7/8-in. thick and the bottom half 1 in. thick. To subject a vessel of this size to the changing temperatures of blocked operations requires, of course, that it be fully stress relieved and its welds X-rayed.

Alloy steels were also used in the principal piping to and from the coke drums. The transfer lines were fabricated from 9 chrome-1 moly pipe and the vapor lines from the drums to the bubble tower from 5 chrome-6.5 moly. Portions of the drum condensate lines, the side vapor lines, and the by-pass lines are also of alloy steel.

Bubble Tower—The 100-ft. high bubble tower is 11 ft. in diameter in its upper section and in its bottom section is enlarged to 12 ft., 6 in. to accommodate the increased downflow occasioned by the introduction of the intermediate reflux and reduced crude feed. Fifteen cast iron bubble trays are used in the upper section and in the lower section ten Type 405 stainless steel bubble trays with eight cast iron baffle trays



below them in the potential coking region. The shell thickness varies from 9/16 in. to 15/16. in and is protected throughout by a 7/64 in. Type 405 stainless steel strip-welded lining.

To reduce construction costs the three sidedraw steam strippers are contained in one 4-ft., 6-in. by 56-ft. shell appropriately divided into three 6-bubble tray sections. The available hydrostatic heads dictate that the strippers be used in the same vertical order as the draw; that is, with the top draw in the top stripper, etc. The strippers are unlined and the trays are all cast iron.

It will be noted that the entire hot oil section of the plant is protected from corrosion through the use of alloy steels. In the bubble tower region, however, some exceptions were made after considering the corrosion tendency and ease of replacement.

Debutanizer—The design of the 4-ft., 36-bubble tray debutanizer follows the conventional pattern. The tower is unlined and all trays are cast iron. To accommodate possible depropanization, the design working pressure was set at 330 psi.

Decoking Equipment—Coke is removed from the drums by a water jet designed by the Worthington Pump and Machinery Corp., which cuts the body of coke into pieces small enough to fall into a crusher car. The crusher car breaks the pieces of coke down to a maximum dimension of 5 in. and feeds the sized coke into a sluice. The coke is sluiced with water into a suction pit from which a coke-water slurry is pumped through a 12-in. line to the storage area. In this area the bulk of the coke is separated from the water and is moved to a convenient location for shipping. The water passes through settling basins to allow any coke fines to drop out and is then returned to the unit for reuse.

The decoking water jet is supplied by a centrifugal five stage volute pump with external interstage passages. A hydraulically balanced rotor was obtained by providing double inlets at the first stage and by placing the four remaining single inlet stages back to back. The double inlet at the first stage also provides a low inlet velocity which permits operation at a low submergence. All impellers are of the enclosed type. A pressure breakdown bushing is provided at the inboard stuffing box so that both stuffing boxes are under suction pressure. The 4000-r. p. m., 1450-hp. turbine drive is supplied with 165-lb. 100° F. superheated steam and exhausts to a 26-in. Hg. vacuum provided by a barometric condenser. Two

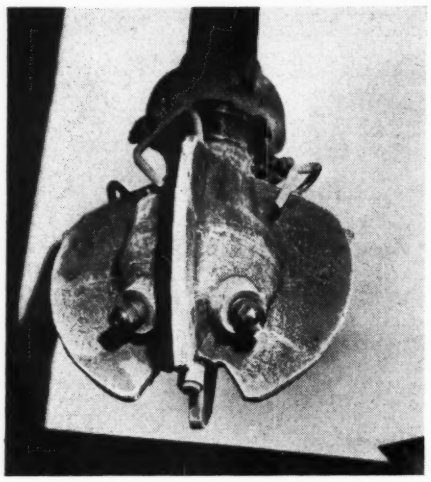


Fig. 3. Hydraulic boring tool.

complete pumping units are provided; one will supply 1100 g.p.m. at 1500-lb.; two in parallel will supply 1600 g.p.m. at the same pressure. Electrically powered block valves, located in the discharge line, operate so as to prevent a shut-off against the pump. When the main block valve begins to close, a smaller bypass valve begins to open so as to discharge the water back to the suction tank. In reverse the valve operation affords the same protection. From the pump discharge the jet water flows to a manifold at the top of the coke drum.

A 100-ft. derrick structure is mounted over each pair of coke drums *(See Fig. 2)* to support the drilling equipment. Each drilling assembly includes a continuous length of drill stem which is long enough to reach the whole length of the drum and to which the boring and cutting tools can be attached. The drill stem is coupled at the top to a swivel head which is rotated by an air motor and which can be raised or lowered by a steam winch. An assembly of Chicksan joints form a flexible connection to supply jet water to the swivel head. Block valves have been provided in the jet water lines to each drilling assembly. These valves are closed whenever the drill stem is removed from the drum so that no one would be injured if the high pressure water were inadvertently turned on.

The cutting devices for removing coke are a boring tool, a reaming tool, and a cutting tool. The boring head which is illustrated in *Fig. 3* is essentially a round ball about 10 in. in diameter which is tapped for water nozzles. One ½-in. nozzle is located in the bottom to direct a jet straight downward, and four ⅜-in. jets are symmetrically arranged about it to direct the water downward at about 45° from the vertical. Two ⅛-in. jets are directed upward to keep any coke fines from settling on top of the tool and stopping its rotation.

For reaming, the same tool is used, except that the bottom jet is removed and plugged off, and the four ⅜-in. nozzles are replaced with ½-in. nozzles.

The cutting tool shown in *Fig. 4* is a hydraulically designed assembly which splits the single stream of water in the drill stem into four jet streams. Two streams are projected horizontally at the top of the tool and the other two at the bottom are directed upward at such an angle that they cut the same plane as the horizontal jets at the surface of the coke drum, or at a distance of 8½ ft. from the axis of the drum. The nozzle tips in this tool are replaceable and at the present time ⅝-in. tips are used in the bottom nozzles, while 7/16-in. tips are used in the top.

The crusher car *(Fig. 5)* which grinds the coke to a size easily pumpable by the coke pump, consists of an 11 ft. by 14 ft. hopper which feeds the coke to two 2 ft. diameter by 5 ft. long toothed rolls spaced 5 in. apart. The rolls are driven by a 40-hp. motor. The crusher car is mounted on wheels and a track so that it can be positioned beneath any of the four drums. A "grizzly," fabricated of 1 in. by 8 in. plate, has been added near the top of the hopper to keep any large chunks from bridging over the crusher rolls or damaging them by impact.

The crushed coke and the water from the jets pass between the rolls into a sluice which leads to a coke sump. Additional sluice water is added to the ditch as needed to keep the coke and water from piling up under the crusher car. An Allen-Sherman-Hoff Hydroseal coke slurry pump, located in a pit adjoining the coke sump, pumps the coke-water slurry through a 12-in. line to the coke storage area located some 2500 ft. from the pump. The pump derives its name from the clean water supplied to the case to seal the impeller. This water also serves to flush grit away from the close clearance area between the impeller shrouds, shaft, and suction eye, and the rubber lining provided in that area. The speed of rotation of the pump can be varied by means of an adjustable sheave on the motor and three sizes of sheaves on the pump. At 600 r.p.m. the pump will discharge about 3000 g.p.m. of water over a coke outlet some 38 ft. above its suction nozzle through 2500 ft. of 12-in. line.

Special hydraulic lift cars were designed to raise and lower the heavy bottom heads of the coke drums. Had only one car been provided, the track system would have been needlessly complicated to permit moving one car

past the other. This complication was avoided by providing cars to be placed on the single track on both sides of the crusher car. Also, with two cars, two drum heads can be worked on at the same time. The hydraulic lifts operate on 90 lb. water and are individually capable of supporting the bottom head plus the drum weight of water.

Operation of the Unit

Feed Induction—Reduced crude is charged to the bubble tower by Quimby screw-type charge pumps under control of a flow-controller which regulates the rate by positioning a by-pass valve between the pump discharge and suction. The reduced crude is preheated by exchange successively with the light gas oil product, the medium gas oil product, the intermediate reflux stream, and the heavy gas oil product before entering the bubble tower at two points, at the top baffle tray or five baffle trays above the cracked vapor inlet and at the second baffle tray from the bottom or two baffle trays below the cracked vapor inlet. With a preheat level of only 450° F. the feed serves as a hot reflux and care must be exercised to avoid transferring so much heat to the tower bottom product, through a contact with the cracked vapors (the sole source of fractionating heat), as to impair the fractionation of the tower. This condition is avoided by temperature controlling the flow of reduced crude to the top inlet so as to maintain a constant temperature on the bottom bubble tray. The excess feed is diverted by a pressure controller to the lower inlet. Any feed thus diverted also serves to subcool the tower bottom and thereby reduces the tendency to form coke in this reservoir.

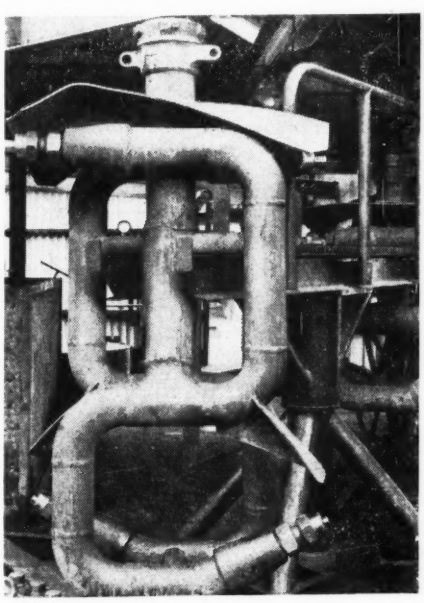


Fig. 4. Hydraulic cutting tool.

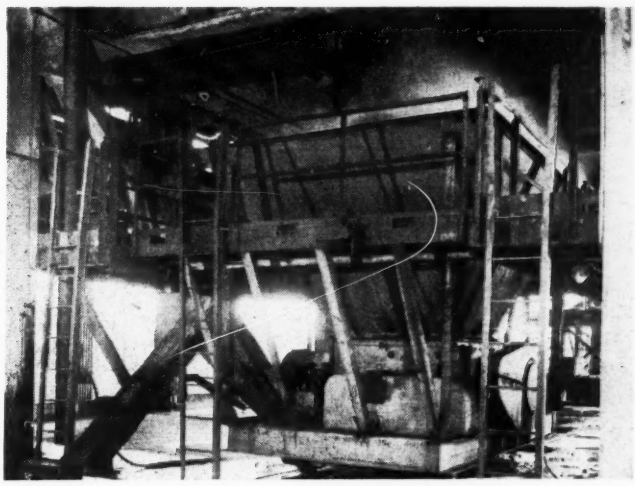


Fig. 5. View of coke crusher in operation.

Heating—Both furnace charge pumps take suction off the tower bottom to deliver the charge to the four parallel coils in each furnace. The radiant section of each furnace is divided into two combustion chambers containing two of the coils. The charge flow is rate controlled to each half of the furnace and the fires in each combustion chamber are separately controlled to maintain a constant temperature at the combined outlet of each pair of coils. The two temperature controlled outlets from each furnace join in a furnace transfer line which discharges into one of the two coke drums allocated to each furnace.

Coking—The heated mixture of vapor and liquid from the furnace enters the bottom of the coke drum. Since only vapors can pass out the top of the drum, any liquid must remain in the drum until it is cracked to vapors and coke. As coke is deposited the incoming liquid and vapor must flow through the coke bed and through or into the liquid on top of the coke. With vapors and liquid continually flowing through the coking region, the coke deposited is of a highly porous nature, which facilitates subsequent handling and contributes to the quality of the product. Each drum remains on the line for 24 hours during which time approximately 250 tons are deposited therein.

Fractionation—The vapors from the two drums currently in simultaneous operation enter the bubble tower between the fifth and sixth baffle trays, numbering from the top. As previously mentioned this stream supplies the sole source of fractionating heat to the tower. The top temperature of the tower is controlled, by means of vaporizing reflux, to pass the gasoline and lighter streams overhead. A portion of the downflow induced by the top reflux is removed from the 10th bubble tray, steam stripped, and delivered to storage, after heat exchange and cooling, as light gas oil. The remaining downflow is augmented at the 15th bubble tray by an intermediate reflux stream and by the additional reflux thereby induced. To handle this additional flow the tower is enlarged at the 15th tray from 11 ft. to 12 ft., 6 in. in diameter. The intermediate reflux is removed from the 20th bubble tray to be cooled by heat exchange with the fresh feed, by supplying heat to the debutanizer reboiler, and by exchange with cooling water if necessary. The intermediate reflux returned to the 15th tray is rate controlled. Should it be desirable to reduce the downflow on the lower bubble trays, some intermediate reflux can be manually controlled to the first baffle tray. As an added means of reducing the coking tendency in the bottom two baffle trays and the tower bottom reservoir, provision has been made to control manually some of this reflux to the seventh baffle tray if needed. The intermediate reflux draw is also used to remove the medium gas oil product which is stripped and cooled. The heavy gas oil, which is also stripped and cooled, is withdrawn from the 24th bubble tray.

The preheated fresh feed is added to the first baffle tray as required to maintain a constant temperature on the 25th or bottom bubble tray, the remaining feed being diverted to the seventh baffle tray. The tower bottoms, which include the fresh feed and recycle, are rate controlled to the furnaces. The lowest sidedraw is withdrawn at the rate required to maintain the tower bottom level. Under this arrangement, with a constant 20,000 B/D charge to the furnaces, the recycle rate is automatically determined as the difference between the fresh feed rate and the total furnace charge.

The bubble tower overhead is cooled and condensed in the cooling tower and is separated into gas and gasoline

TABLE 1. LOG OF A TYPICAL DRUM CYCLE

Elapsed Time (Hours)	Operation
0.0	Switch oil stream to clean drum. Steam full drum to bubble tower.
0.5	Stop steam to bubble tower, steam to blowdown.
0.75	Stop steaming, start cooling with water.
2.75	Stop cooling, start draining water, blinding and unheading.
4.0	Start decoking.
11.0	Finish decoking, start heading up and removing blinds.
12.5	Steam test.
13.0	Finish steam test.
18.0	Start heating.
24.0	Switch in oil stream from full drum.
48.0	Switch oil stream to clean drum.

in the reflux accumulator. The gas flows through a back pressure controller to the refinery's central compressor station, where it is compressed to the central absorption plant pressure. This controller sets the pressure for the entire system so that the pressure on the coke drums and the bubble tower are but 2-4 psig higher than the 52 psig held on the bubble tower reflux accumulator. The resulting pressure at the furnace outlet rides at about 75 psig.

Steam from the stripping and coke drum cooling is also condensed in the overhead condensers and removed from the accumulator through a bottom boot. The hydrogen sulphide content is so high that this water must be steam stripped in the central deodorizer of the refinery before it can be delivered to sewer.

Gasoline reflux is pumped back to the top of the bubble tower under control of a temperature element located in the vapor space above bubble tray No. 2. The net gasoline make is charged to the debutanizer after heat exchange with the debutanized gasoline. The raw B-B is delivered to raw B-B storage for ultimate alky plant feed, and the uncondensed vapors to the central gas plant under its own pressure. For more precise control the tower pressure is maintained by a vapor line regulator. In order to insure a steady reflux pressure and thereby smooth out reflux flow, the accumulator pressure too is controlled within narrow limits through the use of a repressuring controller, which bypasses vapors around the condensers to maintain the accumulator pressure, and a depressuring controller which relieves the excess pressure to the gas plant.

Reboil heat is obtained from the intermediate reflux stream. To reduce the tendency to polymerize the cracked gasoline, it was decided to hold the temperature of the heating stream to 600° F. or below. Since this stream runs close to 700° F., it is first passed through the first of its four heat exchangers and is satisfactorily cooled by exchange with the fresh feed. A temperature element on the 34th tray controls the quantity of heating oil to the reboiler by positioning a three-way control valve. After passing through the reboiler, or bypassing it, the intermediate reflux stream is further heat exchanged against the fresh feed in the remaining three exchangers and cooled if necessary before it is returned to the bubble tower.

Decoking

Drum Cycle—Operation of the coke drums requires that the furnace transfer line product be switched from one drum to another whenever a drum is filled with coke to the designed outage. At normal feed ates each drum is on stream coking for 24 hours and is off stream for cooling, decoking, and heating up for the same period. The drum switches are so timed that one of each pair of drums comes off the stream every 12 hours. Under normal conditions the cycle for one drum is about as shown in *Table 1*.

The transfer line from each furnace is connected to a three-way switch valve which diverts the transfer line product to either coke drum or through a bypass line to the bubble tower. Before switching the oil from one drum to another, the empty drum is preheated by forcing some vapors from the on-stream drum into the top and pumping the condensate from the bottom of the drum into the bubble tower.

Blowing Down—Whenever the oil stream is switched from a full to an empty drum, the full drum must be purged of volatile oils and cooled down so that decoking operations can be started. After switching out of a drum, steam is immediately cut into it, both into the transfer line to the bottom of the drum and into a steam ring just above the bottom cone. The full drum is steamed to the bubble tower for 30 minutes and is then depressured to the blowdown system. After 15 minutes steaming to the blowdown, the steam is cut out and water pumped to the steam ring.

This cooling produces considerable steam which must be handled in the blowdown system located about 2000 ft. from the unit area. The blowdown line exhausts into a small tank about 6 ft. below a water level maintained by a continuous circulation through the tank. The circulation is sufficient to remove the superheat of the steam and to condense any oil vapors. Some saturated steam is vented from an 80-ft. stack mounted on top of the tank. The overflow from the tank runs into a skimming sump to remove any oil. The sump water is cooled by circulation over a two-bay cooling tower, and a portion of the circulating water is diverted through the blowdown tank to maintain the level. The cooling tower was not designed to handle the instantaneous heat load, but rather the average heat load, the volume of water in the system acting as a flywheel or heat reservoir.

When the coke bed has been cooled to 200-300° F. the cooling water is cut out and the drum drained. It is then ready for the decoking crew to start blinding off, opening the heads, and removing the coke.

Operation of the Decoking Equipment—After a drum is cooled and drained the lines leading to the drum are blinded and the manheads removed. With the crusher car positioned under the drum, the boring is begun with the stem rotating at about 8-10 rpm. The drill is lowered as fast as possible without allowing the boring tool to actually touch the coke bed. Normally about 15 minutes are required for the high velocity water to cut a hole through the coke. Some water leaks through the bed while drilling, but the majority is held up in the drum until the tool breaks through at the bottom. In the meantime the coke pump is started up and water alone is discharged through the coke line to the storage area until the boring operation is completed.

After the boring is completed, the reaming tool is moved slowly up and down until the hole has been enlarged to about 6 ft. in diameter. This operation requires from 45 minutes to two hours.

After reaming, the cutting tool is installed and the final cutting is begun with the drill stem rotating at about 5-10 rpm. The coke is cut from the top of the bed and falls down through

the hole into the crusher car. It is usual to lower the tool about 8 in. at a time and rotate it for 2 to 3 minutes before again lowering. Every 5 to 10 feet the jet is shut off and the drum is inspected for cleanliness. It has been found necessary to remove the coke completely on the way down, since any ledges left behind for later removal will frequently fall into the crusher car and plug up the top grating or will bridge across the bottom the drum.

Occasionally the coke is cut from the drum at such a rate that the coke pump, operating at medium speed, will not handle it. When this occurs the cutting rate is lowered by reducing the depth of cut until the excess coke is pumped away. The pump can be set to pump at a faster rate, but it is felt that a good average speed has been fixed which does not unduly delay the coking and which does not pump too much water when the cutting rate is lowered as hard coke is encountered. It is also possible to cut coke so fast that resulting large chunks cannot be handled by the crusher. With the proper care in cutting, the chunks can be eliminated, but it is easily possible to cut the coke faster than the crusher can handle it. The 18-in. grating, added 2 ft. from the top of the crusher car hopper, protects the rolls from damage should large chunks fall from the drum. It also retains the chunks where they can be broken up manually. When the coke is moderately hard the time required from the beginning of the boring until the drum is completely clean averages about 6½ hours. This corresponds to an overall coke removal rate of about 0.7 tons per minute. Considering the time consumed in changing tools, inspecting the drum, etc., the maximum coke removal rate is probably in excess of one ton per minute.

When the drum is completely clean the transfer line and condensate line are inspected and cleaned if necessary, the steam out valves are blasted with steam and the drum heads are replaced. After removing blinds and steam testing the drum is ready for heating prior to another 24 hours of coking service.

Operations in the Coke Storage Area —The coke-water slurry discharges onto an inclined chute the bottom of which is made of 6-mesh steel screen. The majority of the coke rolls down the screen, while the water, together with all material below about 20 mesh, passes through the screen and down a solid chute to a temporary settling pond which is retained by a coke dike. A number of pipes are embedded in the dike and the water overflows through the pipes into a drainage ditch which leads to the secondary settling basin. The coke which rolls off the screen is moved by a bulldozer into piles from which it is loaded onto trucks.

This arrangement for separating the water from the coke is temporary.

A permanent coke-water separating installation, under consideration, consists of a screen chute, a series of hoppers which can be used for loading trucks, and a primary settling basin which can be easily cleaned of coke.

TABLE 2. OPERATING CONDITIONS AND YIELDS

Operating Conditions		
Reduced Crude Charge	15,000 B/D	
Furnace Charge	20,000 B/D	
Recycle/Fresh Feed	0.33	
Temperatures—Furnace Outlet	920° F	
Drum Inlet	900° F	
Drum Outlet	830° F	
Drum Pressure	56#	
Viscosity of Fresh Feed	700 SSF/122	
Yields		
Total Gas	14.0	Wt. %
Raw B-B	0.8	Liq. Vol. %
Debutanized Gasoline	22.5	" " "
Light Gas Oil	36.5	" " "
Medium Gas Oil	16.7	" " "
Coke (by difference)	19.1	Wt. %

Operating Conditions and Yields

Presently the unit is charged with 700 SSF/122 straight run residuum from Wilmington Crude at a rate of 15,000 B/D, which effects a recycle to fresh feed ratio of 0.33/1. The 20,000 B/D charged to the furnaces are heated to 920° F.

The bubble tower is operated to produce gasoline with an endpoint of 380° F., light gas oil with an endpoint of 650° F., and medium gas oil as necessary to maintain a level in the bubble tower bottom reservoir. No heavy gas oil is being removed. In the stripper tower the gas oils are stripped to a flash point which makes them suitable for use as cutter stock, although at the present time the light gas oil is used as TCC charge. Tests are being made to test the feasibility of also using the heavier gas oil in TCC charge.

Under the above operating conditions the following yields were obtained. Additional operating conditions have also been tabulated. *(See Table 2.)*

It is rather difficult to determine accurately coke yields. Because of varying coke density, measurements by coke drum levels do not appear to be too reliable. The above difference method includes in the coke yield any gains or losses in the process. The yields can be roughly checked by means of the weighed haulings which approximate 500 tons per day.

It is likewise difficult to obtain representative coke samples. Samples obtained show approximately 0.25% ash, 9% volatile matter, and a screen analysis satisfactory for its intended use.

As would be expected with this type of process, the high sulfur Wilmington residuum charge yields a gasoline with an appreciable sulfur content. This sulfur content and the olefinic content of the gasoline are sufficient to require sweetening and rerunning. M. M. clear octane numbers in the neighborhood of 70 are obtained with an octane spread of 8 or better. Lead susceptibility is fair and commensurate with the sulfur content.

Because of the desulfurizing characteristic of the TCC process, the coker gas oils have proven to be quite satisfactory as TCC charge stock despite their high sulfur contents. The 650° F. endpoint light coke gas oil, when charged to the TCC units (bead catalyst) with a 1:1 recycle ratio, yielded 41% of 400° F. endpoint debutanized gasoline. Furthermore, an octane level of 79 M.M. clear and octane spread of 10-12 points make this operation look quite attractive.

The low raw B-B yield is a result of the large gas yield from the bubble tower reflux accumulator, which carries with it the bulk of the C-4 production. The total gas yield amounts to 8000-9000 Mcf/Day. The dry gas after absorption amounts to some 7000 Mcf/Day which is just double the requirements at the coking unit furnaces. The excess 3500 Mcf/Day represents an appreciable contribution to the other refinery units' demands.

Effect of Operating Variables

Our operating time has been far too short to establish the effects of operating variables. Nevertheless, some indication of their effect has been obtained. Increased viscosity of the charge appears to shift the gasoline and gas oil production slightly toward more gas and coke. Furnace outlet temperature changes through the range 910-920° F. also had little effect on gas and gasoline yields; however, gas oil production increased with a decrease in coke yields. Reducing the recycle ratio shifted the yields from coke to the gas oil and lighter products.

From the above indications it appears that any benefiit that may be derived from a high removal of straight run gas oil from the charge is not appreciably invalidated by lowered coker yields; yields may be varied extensively by manipulation of the recycle ratio; and higher furnace outlet temperatures may be feasible.

PRODUCTION PLANS FOR 1947

A Report From GAMA

By HAROLD MASSEY

Assistant Managing Director

AFTER studying all methods of gathering information and making predictions, I finally decided on a policy of taking a few sales figures from the industry statistics, which GAMA regularly collects, and I have drawn some personal observations from some of these figures. I have also sampled the industry and asked leading executives for a word or two about their plans and I have tried to combine these opinions to make a composite opinion of the industry.

It was impressed upon me by the executives who contributed, that forecasting this year is extremely difficult and that their combined opinion represents hopes and estimates rather than a reliable, production prediction which might be made in ordinary years.

Despite continuing work stoppages and material shortages, manufacturers of gas appliances and equipment made substantial progress during 1946, in supplying the unprecedented demand for gas appliances. What the production picture will be in 1947 is almost impossible to estimate in the face of present conditions. Every manufacturer in the gas industry will do everything in his power to produce all the goods he can to fill customers' demands and to assist dealers and sales outlets to carry on their business. Seldom in history has the need of unhampered production been so essential.

In the pre-war years of 1936-1940, we used to sell about 1½ million gas ranges per year. During the year 1946, and in spite of the problems which confronted manufacturers, they surpassed the 1936-1940 average production by several hundred thousand ranges. A substantial portion of range production was devoted to Federal Housing Programs and the number of "apartment" and "cooker" models produced was considerably greater than in the record production year of 1941, when the industry produced a little more than two and a quarter million ranges.

Range manufacturers' production facilities have been increased more than 100% over pre-war capacity. The indications are that 1947 range production may not exceed the 1941 figure or, at best, the higher 1946 figure, due to the fact that manufacturers, in general, cannot expect to obtain more steel in 1947 than they received in 1941. Enameling sheet steel and castings are the two greatest uncertainties as far as materials are concerned and, of course, another series of basic industry strikes would make 1947 production anybody's guess.

Range production during the first six months of this year should be at approximately the same rate as it was for the last six months of 1946. It is hoped that the material situation will ease by the middle of the year so that a larger quantity of ranges will be made available during the last half of '47.

Some manufacturers feel that the ultimate consumer is not buying quite so freely now as he did some months ago. They look for this to increase the pressure on the dealer, and in turn on the manufacturer, so that by mid-year, there will be a growing demand for new products which will result in extra effort by manufacturers to introduce new models during the last half of 1947, or at least early in 1948.

While we are talking about domestic ranges, you might be interested in a word or two about kitchen cabinets. The supply is increasing, and while it is far short of the demand, there should be enough of these cabinets available during the year to back up the intensive promotion work which has been carried on in that direction.

It is true that you can't do much with a gas range on new housing if you do not have the meters and regulators to be used in making the installation. The increasing availability of materials needed by the manufacturers, tin and leather for instance, particularly during the second half of 1947, should make possible a considerable improvement in the production of both gas meters and regulators.

WATER heater manufacturers advise the same caution in making predictions, but the picture is a little brighter in this field. During the pre-war years, 1936-1940, we sold approximately 425,000 automatic water heaters per year. Our peak year was 1941 when the figure reached 800,000. In spite of the difficulties of 1946, automatic water heater manufacturers did reach the 1¼ million mark. Much additional production capacity has been created by the enlargement of manufacturing facilities and several new manufacturers have entered the field. The old line companies are hoping for an increase of between 25% and 50% over their 1946 production, but 1947 figures will not be increasing until well after March 1. The newer companies tell me they are now beginning to roll and are ready to make an impression on the industry. The picture ahead, therefore, is one of more production and consequently more competition, and it is soon going to be time for the utility operator to plan to offset competition from competitive fuel appliances in this field.

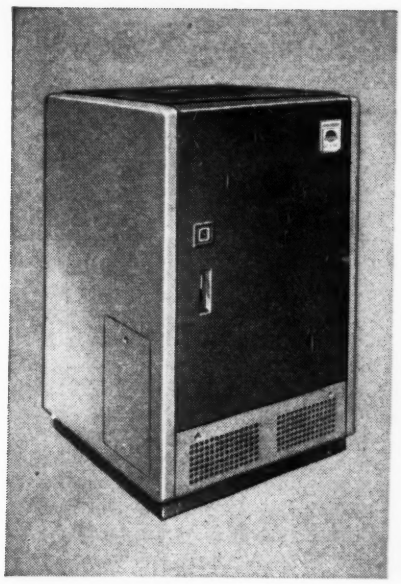
The trend of the water heater industry is toward larger sizes of automatic gas water heaters to supply the increasing needs for new automatic home equipment, and very definite improvements have been made in the construction of heaters.

A companion business to the automatic gas storage water heater is the automatic gas clothes dryer. This appliance presents a new, large and undeveloped market. Surveys indicate 20% to 30% of interviewed housewives are interested in an automatic dryer. One out of 10 washer users is said to be a potential buyer for a clothes dryer. A large manufacturer of dryers expects that two-thirds of the dryers that he will sell in 1947 will be of the gas type, because they are easier to install and cheaper to operate. Gas dryers will be recommended in each instance where gas is used as the fuel for cooking.

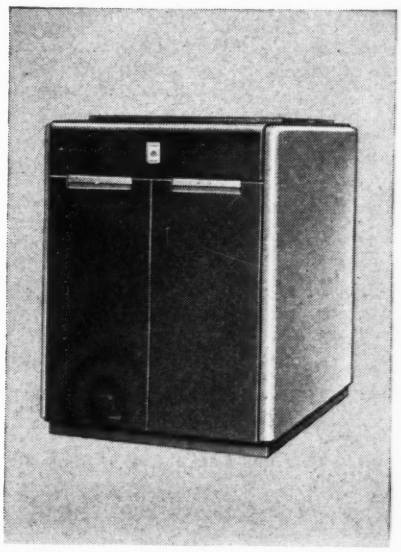
Gas dryers are still very short, but a few are beginning to come through. It is a production line piece of equipment and once the material situation can be cleared away, they will be produced quickly and in large volume.

There should be some increase in the total number of gas refrigerators produced in the year 1947. This major increase will begin after the first of

You can assure your customers of many years of Efficient, Economical Heating



The **EMPIRE** Gas Boiler has all the features essential to perfect performance and customer satisfaction, including patented pin type cast iron sections—the most effective type of cast iron heat absorbing surface. Sections are joined with gas-tight, metal-to-metal fit to assure maximum combustion efficiency.



The **MOHAWK** Winter Air Conditioner has a quiet, dependable cast iron burner with patented high temperature alloy, corrugated ribbons. Rugged cast iron two-section heating element has precision ground faces and asbestos packed, leak-proof joints. Pre-heating of return air saves fuel, increases efficiency.

When you recommend AMERICAN-Standard HEATING EQUIPMENT

AMERICAN-Standard HEATING · PLUMBING

■ American-Standard gas fired heating equipment has been engineered by experts to get full customer satisfaction from every cubic foot of gas.

Excellent performance records make customers willing salesmen of gas as a fuel. You take advantage of this acceptance for your own lines when you recommend the modern gas fired boilers, water heaters, warm air furnaces and winter air conditioners that carry the familiar American-Standard Mark of Merit.

American Radiator & Standard Sanitary Corporation,
P. O. Box 1226, Pittsburgh 30, Pennsylvania.

Serving the Nations' Health and Comfort

LOOK FOR THIS MARK OF MERIT—It identifies the world's largest line of Heating and Plumbing Products for every use . . . including Boilers, Warm Air Furnaces, Winter Air Conditioners, Water Heaters, for all fuels—Radiators, Convectors, Enclosures—Gas and Oil Burners—Heating Accessories—Bathtubs, Water Closets, Lavatories, Kitchen Sinks, Laundry Trays, Brass Trim—and specialized products for Hospitals, Hotels, Schools, Ships, and Railroads.

May and it is going to be dependent upon the continued acceleration in the receipt of steel and other materials. By May 1 Servel expects to be completely changed over to the new, really post-war design in refrigerators, and their production facilities will have been stepped up to the point where, if material is available, they will enjoy a big increase over pre-war production.

THE great increase in the demand for gas-fired heating appliances has been just short of phenomenal. In pre-war years 10,000 gas boilers about represented our annual sales. In 1946 the sale of gas-fired boilers reached something like 25,000 units. The situation is the same with furnaces; 50,000 used to be a good year, but with all our troubles in 1946, we trebled this output. The conversion burner story is well known to you all. Twenty thousand or 30,000 per year was a big year before the war. If there were any way of totaling 1946 sales, we would find the figure reached more than 200,000 burners—possibly 300,000.

The availability of material for house heating equipment and the prospects of further increase in production have both materially improved recently. This is a natural expectancy since the number of strikes decreased after the large ones of last spring and summer. Moreover pipe lines of supply and inventory are becoming filled.

A continuation of this progress is going to mean a considerable improvement in central heating appliances available for 1947 sales. Some manufacturers estimate that the supply will catch up with the demand on most items by the third or fourth quarter of this year and that a competitive selling situation will develop before the start of 1948. Due to the large increase in the number of conversion burner manufacturers and the number of restrictions in many areas on the supply of gas for heating, we have already reached this point on conversion burners. Gravity furnaces are quite generally available. 1947 is going to find heating equipment manufacturers producing a record volume and perhaps the major increase will be that in the production of gas-fired furnaces. Manufacturers, producing equipment for all fuels, are allocating additional percentages to gas-fired units.

All manufacturers of central heating equipment warn that, if the steel industry goes out on strike next month, prospects will change very rapidly for the worse and this will delay the anticipated accelerated production boost.

SPACE heater manufacturers feel that 1947 production is going to be limited as was 1946 production because of the shortage of sheet steel and iron castings. It is expected that these supplies will be better toward the end of the year and that there may be some increase in production.

During 1947 most of the older manufacturers are going to be under pressure to supply a greater volume than in 1946 to their substantial customers of long standing. They are going to make every effort to provide for these accounts and it is expected they they will do so.

Several new firms have entered the space heater business and hope to produce models using other than the traditional materials used heretofore and now in short supply.

Some of these newer materials are now becoming quite scarce and deliveries are being delayed from this newer source. These newer manufacturers are going to influence changes in design and some of these changes will be introduced during 1947. Generally speaking, these changes will be just in appearance. Many manufacturers are also making changes in construction details in order to reduce cost of manufacture and in order to eliminate production delays caused by the shortage of traditional materials.

It looks as though the space heater supply will not meet the demand this year and that 1947 will be a year of continuing adjustment in this field.

In the hotel, restaurant and institutional field, the peak of "orders received" seems to have been passed and the demand is now slackening somewhat. The demand is still heavy and production will remain at high levels for months to come. While manufacturers are behind in delivery they are gradually beginning to catch up on their backlog which, it is hoped, will be absorbed entirely during the first six months of 1947, after which prompt shipments should again be the rule.

Surveys made by some manufacturers indicate that the hotel and restaurant trade is becoming very conscious of styling as well as efficiency, and plans for the future are being formulated with that trend in mind.

INDUSTRIAL gas equipment was produced during 1946 to the capacity of the plants engaged in this business. In spite of record production there is a large backlog of orders and actual shipment continues on a long term basis. Manufacturers are conscious of the extreme demand and some are considering expanding facilities to provide a greater production capacity.

I want to impress again the difficulty of making broad industry predictions in normal times, and the particular difficulty of doing so in unpredictable times, such as we are now experiencing. I hope they will be of some value to you in your planning. You can help manufacturers at this difficult period in their experience by eliminating, wherever possible, demands for "specials." Almost all gas-fired equipment is volume produced for manufactured, mixed, natural and liquefied petroleum gases alike. When volume production has to be interrupted to build appliances to special requirements, the result is short runs, higher cost and delayed deliveries.

You may be assured that manufacturers appreciate the present demand for the special equipment they make. They are making every effort to produce quality merchandise to meet this demand, to prevent any influx of competitive fuel equipment, and to relieve sales embarrassment.

Wellhead Price Order Relief Appeal Denied

The Oklahoma Corporation Commission has denied an application of Phillips Petroleum Co. to vacate or set aside the commission's recent order which fixed the price of natural gas at the well in the Guymon-Hugoton field of Oklahoma at 7 cents per Mcf.

Counsel for Phillips asked that the order be modified to exempt from price fixing gas produced in the field but not sold at the wellhead, but instead transported by Phillips across state lines for delivery at its processing plant in Hansford county, Texas. After processing there, the residue gas is enriched with hydrocarbon vapors for sale to Panhandle Eastern Pipe Line Co. Average price now received for this gas is 4.67 cents per Mcf, Charles W. Binckley, in charge of gas production and allocations, said.

Phillips did not participate in the original hearings last year which resulted in the price fixing order on application of Peerless Oil and Gas Co. vs. Cities Service Gas Co. The latter company is now planning an appeal to the Oklahoma supreme court.

Heat Transfer Authority To Address CNGA-ASME

Dr. L. M. K. Boelter, Dean of the U.C.L.A. College of Engineering and internationally recognized as an authority on heat transmission, will address a joint meeting of the California Natural Gasoline Association and the American Society of Mechanical Engineers March 6, 1947, Downey, Calif. Dr. Boelter will discuss heat transmission problems of the petroleum industry.

PENTALARM

THE WARNING ODOR FOR FUEL GASES

- 90% Amyl Mercaptan.
- UNMISTAKABLE Odor warns immediately.
- Assures adequate and uniform odorization under all flow conditions.
- Easy to introduce into pipelines and mains.
- Most economical of all odorizers. 400,000,000 cu. ft. of gas odorized by one 55-gallon drum of Pentalarm.

You'll want the valuable facts contained in the Pentalarm Booklet. Write for your copy today.

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SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

PHILADELPHIA • CHICAGO • NEW YORK

Selling The Blue Flame*

IN TWO PARTS:

1. **Youth Classes**
   By Arra Sutton Mixter
2. **Bride Classes**
   By Gladys V. Bramblett

YOUTH CLASSES

By ARRA SUTTON MIXTER
Home Service Director,
The Hartford (Conn.) Gas Co.

IN planning the promotional program in the spring of 1941, ways and means of reaching youth groups were discussed. As a result, the Joy House Girls' Club, now known as the Junior Homemakers Club, was inaugurated. This club, with no fees, was opened to girls in greater Hartford between the ages of 8 and 12 years. Newspaper articles and advertising told the story to the public.

To increase interest in such an organization, a limerick contest was sponsored by the company with prizes for the winners. The girl winning first prize received a complete Easter wardrobe which she, with one of the judges, selected. You can well imagine how thrilled the girl and her parents were. The second and third prizes were Easter baskets with 5 crisp one dollar bills hidden inside. The interest of the youngsters was tremendous, and the club was launched.

Junior Homemakers Club

When a girl applies for membership in the Junior Homemakers Club, she receives a card to be filled out, signed by one of her parents and mailed in or brought in at the next meeting. She is then eligible to receive her club pin and identification card. The gold pin depicts a little girl holding the hand of a small figure, the Magic Flame, which of course represents the blue gas flame. These tiny emblems mean a great deal to the club girls.

Cards are sent to all members reminding them of the meeting which is held on the last Saturday of each month from 10 to 11:30 a.m. The program has become more or less standardized, as this facilitates handling such large groups.

The club session always starts off with a cooking lesson. The care and use of gas appliances, and a discussion of the simple recipes and their preparation take up about 40 minutes. This lesson is not conducted as a lecture demonstration but instead is a class where as many members as possible take part. In fact, the whole idea is to have as much class participation as possible—and we have found them eager to come up on the platform.

One girl reads the recipe in front of the microphone, and others prepare the recipes with help from the teachers. When asked "Who knows how to set the heat regulator?" or "Who would like to wash dishes?" up go several hundred hands. Such tasks are much more fun in class than at home. Although activities start at 10 o'clock, when the doors open at 8:30 there are always some girls on hand who want to help with the preliminary preparations. Following the lesson comes the club song, led by one of the girls.

Then it's time to find out who has a birthday. Those who have are called up to the platform and willingly give their name and age. The food prepared during class is given to this group.

Refreshments are then served. Ice cream and cookies are the most popular and easiest to serve, though chocolate milk, when procurable, is a close second. It is necessary to serve this group as quickly as possible; so the girls march in line through the kitchen, receive their refreshments, and return to their seats. Various members do the serving and see that the girls keep in line. Straightening up after class is also done by the members.

While the operator is setting up the movie machine, it's time for another song or two. The movies, which are carefully chosen, include cartoons and an educational film. There is no trouble keeping the interest of the group for this next half hour, for they pay strict attention to the activities on the screen. Following the movie, the lights are turned on and the meeting is over for another month.

The club proved so popular in Hartford, growing to over 500 members, that similar clubs were organized in Wethersfield, East Hartford, and Manchester. They were very well attended but, because of the difficulty of securing suitable meeting places, and the curtailment in personnel during the war, these other groups were discontinued.

The purpose of this club is to stimulate in these youngsters a desire to help at home and, most important, to learn to cook with gas. Interest is sustained by home projects during the year, which are reported on at monthly meetings. The projects are devised around the recipes and household duties which the girls are taught at their meetings. Reports brought in by the youngsters cover the home tasks they have done and the foods they have prepared. These slips must be signed by their mothers.

Since its inception, the club has not needed much promotion. Even the notice of the first fall meeting which was run in both the local newspapers has been discontinued as it brought more applicants than could be accommodated. The membership has grown by word of mouth and through addition of younger sisters reaching the eligible age. The attendance last year averaged 300, which is a sufficiently large group for three people to handle. Even this cannot be done successfully without a public address system.

We have the whole-hearted support of the parents who are as enthusiastic as the girls themselves regarding this activity.

Girl Scouts

IN addition to the Junior Homemakers Club, classes are conducted each year for various Girl Scout groups. Even though some of them may attend food classes in school, they enjoy the informality of our meetings and the actual experience which they get.

A definite course of seven lessons is planned around the requirements for the cook's badge as given in the Girl Scout Manual. Registration is limited to 16, which is the maximum number we can handle. The girls work in groups of two in our test kitchen and on the demonstration platform.

* A symposium of five papers presented at the New England Gas Association Home Service Development Conference in October. Two are published here.

VALVES FOR GAS BY DETROIT BRASS

INDEPENDENT ADJUSTMENT OF "MEDIUM" AND "SIMMER" HEATS

WITH DBM *Flame Control* -RANGE VALVE-

Accurate, Worry-Free Operation Assured with New DBM "Flame Control" Range Valve—Predetermined Settings Eliminate "Bend" and "Squint"—Delivers Perfect Results with Automatic Ease and Simplicity.

COMPLIMENTS on her cooking skill will be in store for the housewife whose range is equipped with *Detroit Brass "Flame Control"* range valves. She will save time, effort and fuel and gain assurance that the desired cooking results will be obtained.

The discriminating housewife will demand *DBM "Flame Control"* valves on her new range. She will be enthusiastic about the independent positive adjustment of the "simmer" and "medium" positions, one of the exclusive advantages of DBM "Flame Control."

She will be impressed, too, with the improved audible "click" in the "full on" and "medium" positions. This "click" feature simplifies and speeds up the locating of the positions and, more important, eliminates the tiring "bend" and "squint."

The independent adjustment of the "medium" and "simmer" flames, made from the front of the range through the manifold concealment panel, is another feature engineered into *DBM "Flame Control"* valves. This provides a more rapid and effective means of adjustment.

Fashioned from a forged body and produced to AGA performance and constructional requirements, *DBM "Flame Control"* is designed to maintain its function for the life of the range.

Gas Appliance Fittings Produced by Detroit Brass & Malleable Works Include a Complete Line of Valves for Gas Ranges, Water Heaters, Space Heaters, Gas-Fired Furnaces and Wall Heaters.

GAS VALVE DIVISION

DETROIT BRASS & MALLEABLE WORKS

DETROIT 9, MICHIGAN

These classes are conducted much as they are in school, with fewer restrictions of course and no split recipes. Each group of two makes the full recipe which is printed on the lesson sheet, and, as several foods are prepared at each lesson, the finished products are pooled and served to the troop. This gives them the experience of cooking as they would at home. They also receive training in table setting and in good manners.

At least one leader—and often two—accompanies the troop to be sure they arrive on time and return home safely. Generally these classes, an hour and a half in length, are held immediately after school. It is surprising, after the first lesson, how quickly the girls get into the swing of it, and how much they accomplish in a short time.

Each scout keeps a notebook, inserting the mimeographed lesson sheets and illustrative material such as posters and pamphlets from the Poultry and Egg Institute, Dairy and Food Council, the State Department of Health, and other authoritative sources. There is considerable competition among the girls and each vies with the other to have the most attractive and informative book.

At the completion of the course, the girls are eligible to receive their cook's badge. To make this an occasion, the seventh lesson is a party lesson and the scout executives and mothers are invited for tea. The class prepares refreshments, sets the tea table, and serves its guests. This gives them credit toward their hostess badge, too.

We have many more requests for these classes than we can schedule, but we try to select the troops which need it most. In some instances, various groups come in for special demonstrations, such as planning well-balanced meals, cooking for invalids, or a discussion of canned products, their size, contents and labels. We are often asked to help some troop with quantity recipes for use in group meetings or in day camps.

We have carried on a program with Girl Scouts for the last 18 years and have always found them responsive and appreciative of the efforts of the gas company.

Housing Project Girls Clubs

THERE is still another junior group which has been contacted during and following the war. I refer to the girls club organized at several of the housing projects. These groups meet at their community hall and the ages vary from 8 to 16. As there is only a small kitchen unit adjacent to the auditorium, it is necessary to conduct these classes in much the same manner as the Junior Homemakers. However, the groups are smaller and most of them are organized as a club with officers who hold a regular meeting. This is followed by a "cooking lesson," in which the girls participate as much as possible, the older members assisting the leader. These girls have little opportunity for instruction at home as many of the mothers are working, and they are grateful for this opportunity of receiving even limited instruction.

The Hartford Gas Co. considers the work with junior groups an essential part of its promotion program, because it helps to educate tomorrow's users of gas appliances and it also maintains contact, through the children, with the present market.

BRIDE CLASSES

TODAY we home service women need no longer rack our brains for a good medium for our sales cooking classes. The influx of new brides and brides-to-be has made it very simple for all home service departments to reach groups of new prospects and consumers with very little effort.

There are various methods of assembling the classes and there are many types of courses offered by home service departments all over the country. You have read about these in the gas trade magazines that you receive. The courses, however, all cover basic cookery with gas as the ideal fuel.

The large utility companies are able to do more advertising and present to their groups more elaborate material.

By GLADYS V. BRAMBLETT

**Home Service Director,
Fall River (Mass.) Gas Works Co.**

However, whether it is a large or a small company, we all have a common aim—to obtain more gas customers.

I believe that one of the reasons I have been invited to present this subject to you is that most of my home service experience has been in a one-girl home service department. Since many of you are in the same position, I shall relate to you only my experiences with classes for brides.

I had four series of classes in 1945, two starting in January and two in March. I conducted two series each week, one afternoon class and one evening class. To organize the classes we ran two large advertisements in the local newspaper ten days before the series started. They were captioned: "Attention - New Brides - Servicemen's Wives - Business Girls - Cooking Made Easy in Five Lessons." At the bottom of the advertisement, we had a coupon to be filled out for registration.

Right here I think you will be interested in the response to this advertising. For the first evening class, I received a registration of 80 women and had an average attendance of 60 women. For the first afternoon class, I received a registration of 57 women with an average attendance of 38 women.

In the third and fourth series of classes, I had an evening enrollment of 60 women with an average attendance of 65. For the afternoon class, I had 30 women enroll with an average attendance of 31. We really had no brides at all in the afternoon classes but all older women—women who have filled up the seats for years at gas company cooking schools just to have something to do to fill in time, and who came to win a prize. Consequently, we have discontinued all afternoon classes for this type of demonstration.

The classes were two hours in duration with a 10-minute stretching period in between. All the classes were very friendly and informal and the audience was invited to ask questions at any time in order to be thoroughly familiar with all phases of cooking. Food prizes were given at the end of each class.

THE entire course was concentrated on "Basic Cookery with Gas—the Ideal Fuel." I assumed that the audience was absolutely "green" at cooking, which most of them were. For those who had some experience, it was a thorough review with a lot of new angles added.

The nutritional value of each food group that I cooked was stressed the first five to 10 minutes of each hour. For this purpose I used as visual aids the various vitamin and mineral charts distributed by companies such as the American Meat Institute, Poultry and Egg Institute, Wheat Flour Institute, etc.

The course was grouped as follows:

Class 1:

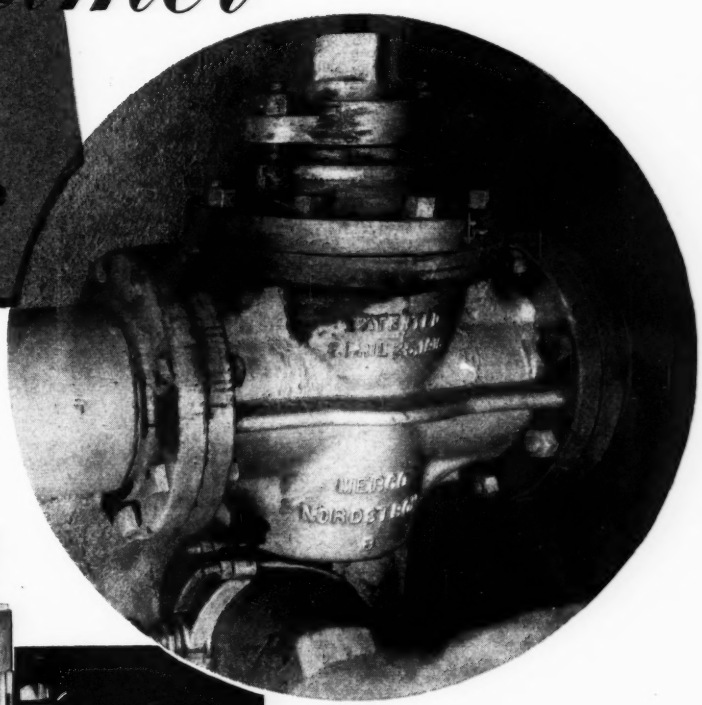
(A) Standard measurements.

(B) Biscuits and muffins.

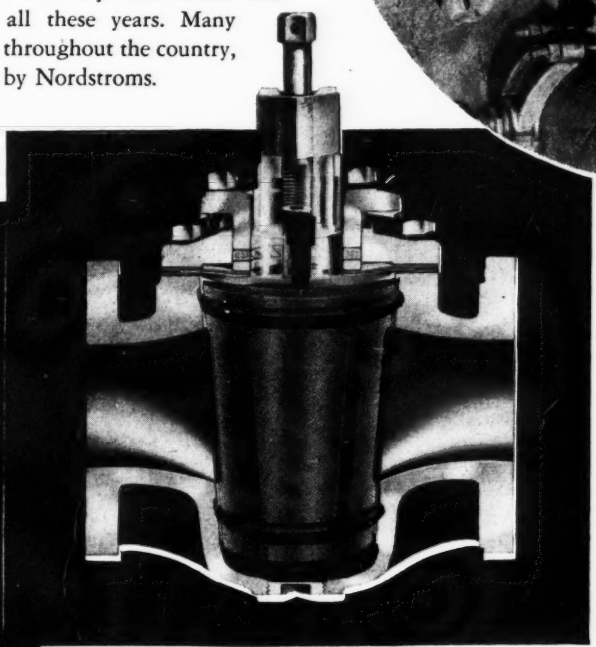
I started right from scratch, showing the women how to sift dry ingredients and how to measure both dry and liquid ingredients as well as shortening and how to use measuring spoons. The Table of Equivalents was

Old Timer

—INSTALLED IN 1921
—STILL IN SERVICE
—good for years to come



One of the first Nordstrom lubricated valves to be installed by a public utility was placed in service on a main send-out regulator manifold at San Jose, California, in 1921. The valve, illustrated at the right, was installed between a high pressure holder and city distribution line. This old timer has served all these years. Many other old timers are in service throughout the country, proving the long life offered by Nordstroms.



NORDSTROM FEATURES:

- PRESSURE LUBRICATION
- "SEALDPORT" PRINCIPLE
- QUARTER TURN
- ROTARY ACTION
- RESILIENT SEATING
- NO SEAT EXPOSURE
- STREAMLINED

"SEALDPORT" PRINCIPLE PREVENTS LEAKS

In the Nordstrom patented "Sealdport" system, the grooves are divided between the body and plug in such a manner that the port is surrounded with lubricant in closed position, and the exposed groove sections are disconnected from the lubricant supply before they are brought in contact with the line fluid space while the plug is being turned. These grooves are automatically reconnected when the plug is brought to the full open or closed position.

LUBRICATED, FOR SAFETY

On gas lines, safety is of first importance. Nordstrom valves, with their pressure lubrication, insure easy turning and positive closure. The lubricant pressure forms a seal around each port.

Nordstrom valves are in wide use on gas lines, at control stations, in compressor plants, etc. Power operated valves are provided for remote control. An automatic valve arrangement with self-closing features is available for main line service.

Service cocks embodying lubrication can be provided for curb and meter use.

Patterns are available which permit replacement of, and interchangeability with, standard flanged gate valves.

Nordstrom valves conform to National Standard Specifications as to pressure ratings, dimensions, and construction.

KEEP UPKEEP DOWN

Nordstrom
LUBRICATED VALVES

NORDSTROM VALVE DIVISION — *Rockwell Manufacturing Company*

Main Offices: 400 North Lexington Avenue, Pittsburgh 8, Pa., Atlanta, Boston, Chicago

Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa

Export: Rockwell International Corporation, 7701 Empire State Bldg., New York 1, N. Y.

also discussed. The value of enriched and whole wheat flour was stressed before we started mixing and baking. I used a blackboard to show a wheat kernel, its composition, what was removed in milling white flour, and what was then added by the enrichment process.

Class 2:

(A) Cakes.
(B) Pies.

In this class, I used the starlight cake as a base butter cake, demonstrating the standard mixing method and the one-bowl method of mixing. I mixed one by hand and one by electric mixer. I also demonstrated the seven-minute icing. A chocolate cake, a layer cake and cupcakes were previously baked and frosted for display and prizes.

For the pies, I used the Spry folder "How to Make Perfect Pastry" and the Spry recipe for pastry. I made a pie shell and put an apple pie together, and made and baked the meringue for a lemon pie. I had cherry tarts all made plus an extra apple pie for additional prizes.

Class 3:

Meats.

In this class, which covered the entire two hours, all phases of meat cookery were demonstrated. The use of variety meats and their importance in the diet was also stressed.

Class 4:

(A) Vegetable Cookery.
(B) Salads.

For vegetable cookery, I used potatoes, carrots and broccoli for top-stove cookery and then baked two vegetables for variety.

For the salad class, I made French dressing, mixed a salad bowl and made six individual salads using fruits and vegetables and all the salad greens available. Two large salads as the main dish for buffet suppers were also demonstrated. The molded salads were prepared in advance.

Class 5:

(A) Fish Cookery.
(B) Egg Cookery.

Broiled, baked, fried and creamed fish were demonstrated.

Cheese souffle, puffy omelet, and how to fry, soft and hard cook, and shirr eggs were demonstrated.

As I have no help in mimeographing, I used outside material whenever possible, cutting down on mimeographed sheets. This is a condition most one-girl home service departments have to meet in the best way possible.

As an inducement to attend all five classes, I offered the booklet "Ten Lessons in Meat Cookery" purchased from the American Meat Institute for 10 cents each. It proved to be a very attractive bonus. I had pleas for the book from women who had to miss a class due to unavoidable circumstances. I gave the women a chance to make up their missing class in either the following afternoon or evening classes—just so they could get the booklet. A dentist and a lawyer called me to ask for the booklet for their daughters who had missed a class and were disappointed in not receiving one. It is definitely a good idea to have an attractive bonus to keep up attendance.

Second Course in 4 Classes

THESE courses in Basic Cookery were followed up in October by popular request, with a post-graduate course of four lessons in "Modern Gas Cooking." A personal letter was sent to all the women who attended our brides' classes. I received many personal replies with the registrations that were very flattering and gratifying. In this course the attendance was as follows: 1st class, 113 women; 2nd class, 144; 3rd class, 132; 4th class, 160.

The first two classes were on "Holiday Cooking." For the third class I was fortunate in obtaining the services of Florence Schwartz from Fannie Farmer's Cooking School. Her demonstration on cake decorating is very spectacular and very practical, and it was the first one of its kind held in Fall River. The course was climaxed by having Sol Weill from the George D. Roper Corp. put on his famous high-pressure sales cooking demonstration. Needless to say, it was a riot. This class was followed by a Hallowe'en buffet lunch. It was a grand finale for the entire year's work.

I was fortunate at the time in having a CP range on the platform. Every food item cooked gave me the opportunity to demonstrate the advantages of gas range top-stove cooking, oven baking, roasting and broiling. The advantages of the CP range were stressed, as well as those of the Servel gas refrigerator. The care of the range and refrigerator was also discussed at great length.

At all the classes, I took the opportunity to inform the women of the services my department offers. The sales department, of course, sold many ranges to these women but I know they would have purchased a range at this time out of necessity without attending classes. However, we found that these women did wait for CP ranges and others of our better models before buying. We feel the interest created was worth while, not only for gas appliances but for the fuel.

Gas Plants Rank High in Efficiency

AMERICAN electric and gas utilities have improved their efficiency of operation, as measured by output per man, more than twice as rapidly in the past four decades as any other major sector of the economy, according to a new study published last month by the National Bureau of Economic Research.

Since the turn of the century, labor productivity in the utilities, including electric light and power, manufactured and natural gas, has risen at the remarkable rate of 4% per year. For other sectors of the economy, such as manufacturing, agriculture, mining and railroads, comparable gains in labor productivity range below 2% per year.

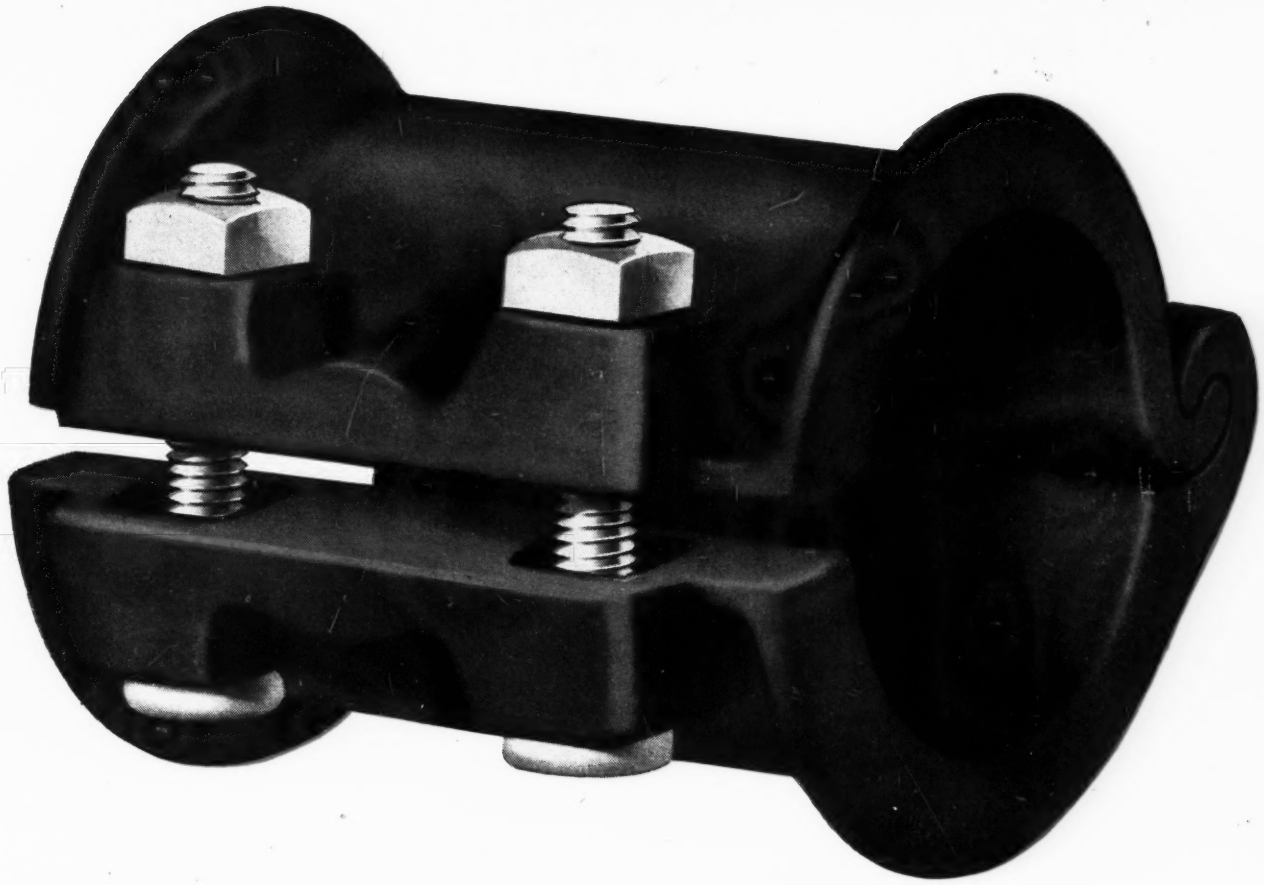
The study has just been issued in book form under the title, "Output and Productivity in the Electric and Gas Utilities, 1899-1942," by Dr. Jacob M. Gould.

The report finds that between the opening of the century and the outbreak of World War II the output of the electric light and power industry multiplied 40 times. The output of manufactured and natural gas rose almost sevenfold.

The rapid rise in utility output, proceeding at an average annual rate of about 8% per year in the period considered, was accompanied by increased consumption of labor, fuel and capital, but these components of input all lagged far behind output. Thus in electric light and power plants the number of persons employed per unit of product was reduced by four-fifths between 1902 and 1939. In the gas utilities, workers per unit of output were cut by more than one-half.

Rapid as were the reductions in unit labor requirements between 1899 and 1937, the sale of their products rose so substantially as to induce considerable increases in employment. The number on payrolls of the electric light and power industry increased ninefold over these four decades; and in the gas industry the increase was threefold. With the total labor force of the United States approximately doubling during the first four decades of the century, this meant that the utilities provided new sources of employment.

The report emphasizes the role played by capital in the development of the utilities and points out its importance. Figures presented in the report show that in both gas and electric plants fixed assets (deflated for price change) rose.



EMERGENCY PIPE CLAMP

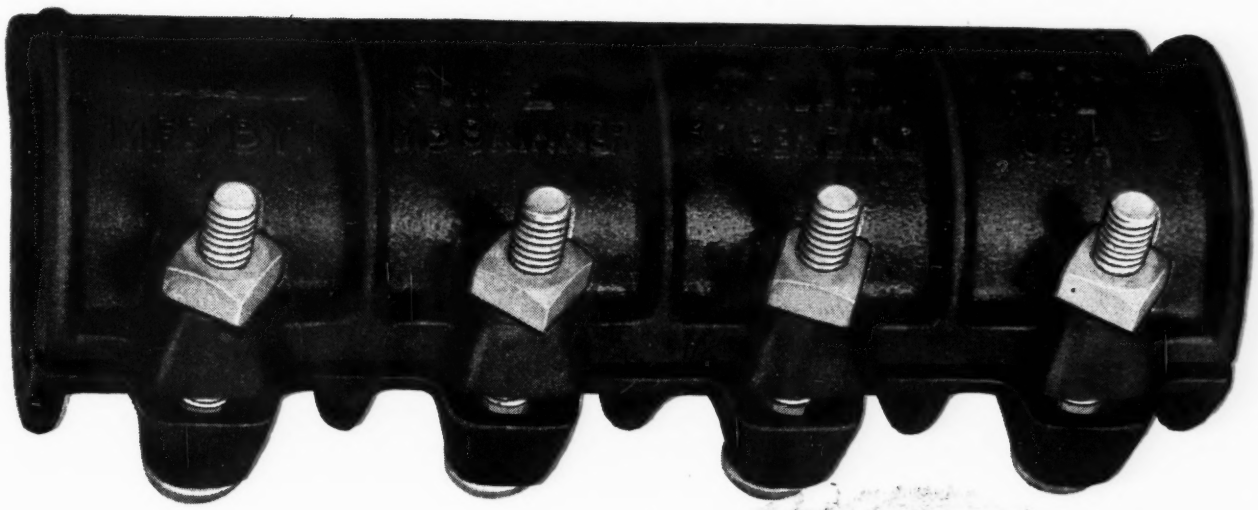
SKINNER-SEAL

PIPE LINE CLAMP

★ Two pipe repair clamps—in universal use for nearly half a century! Single length, SKINNER-SEAL Emergency Pipe Clamp—double length, SKINNER-SEAL Pipe Line Clamp.

Delivery situation is improving slowly but still spotty—suggest placing orders as far in advance as possible.

M. B. SKINNER COMPANY
SOUTH BEND 21, INDIANA, U. S. A.



ACCIDENTAL IGNITION OF GAS

By A. W. BREELAND

Supervisor of Safety, Lone Star Gas Co., Dallas, Texas

UNDOUBTEDLY the greatest worry of all gas industry executives and supervisors from an accident standpoint is the fear of having a man burned or injured in an explosion.

We cannot eliminate oxygen, but we can to a very large degree eliminate the source of ignition. In addition to the known sources of ignition, there is the possibility of static electricity, soil currents and stray currents from power transmission lines. It is, therefore, important that steps be taken to prevent static or stray currents as a possible source of ignition.

Every effort should be made to eliminate the need for men working in gas. This should start with the blueprint. Equipment and facilities correctly designed and installed makes for less maintenance.

Our next step in controlling injuries from fires and explosions is a training setup which insures that employees are thoroughly trained in the jobs to which they are assigned.

The third step is to provide proper tools and equipment.

The final step is a program or plan of procedure which will insure that all of these steps are carried out.

Design and Engineering

Pipe lines and other gas handling installations and equipment must be designed and built properly to stand the maximum working pressure to which they might be subjected and to allow for future expansion. In this connection, let me emphasize the importance of requiring code-tested welders to make all welds which are to be subjected to gas pressure. It's fallacious to order pipe and fittings for 700 lb. W.P. and then to allow any welder to make the joints. The location of block gates to permit the draining of small sections of pipe line permits more frequent shutdowns for necessary work, reducing exposure to gas.

Another very important factor is to obtain, as nearly as possible, complete protection against corrosion and electrolysis. This cuts the leakage potential and thereby reduces the possibility of exposure.

The need for thorough training of the men who must be exposed to the hazards under discussion cannot be emphasized too strongly. Each man should not only know how to perform each step of his job correctly, but he *must* also know the accident potentials in connection therewith and how to avoid them. He should know how and when to use protective equipment and how to give first aid.

He must be thoroughly trained to try to eliminate all potential sources of ignition before commencing a job where he is likely to be exposed to gas or gasoline vapors. This includes the removal of all matches, cigarette lighters, and welder's torch lighters from clothing.

Much of our knowledge has been gained the hard way. We lost one man, had another seriously burned, and lost a plant in 1931 because the operator thought that a quick way to shut an engine down was to pull the spark plug wire from its connection. On that occasion a discharge header failed, filling the compressor building with gas. The operator, in an effort to shut the machine down, immediately jerked a spark plug loose from its connection. Instantly there was an arc, and two terrific explosions, one following the other. That man was killed and his helper was severely injured.

All of our spark plug wires now have solid connections, making it practically impossible to pull the wire off. All operators are also instructed not to attempt to shut an engine down by pulling spark plug wires, and all stations are provided with quick closing valves for shutting off the fuel supply to engines and boilers. The stations built in recent years have power operated valves, remotely controlled, for shutting down compressor stations.

Men should be taught that when they have been exposed to gas and gasoline vapors, they must not get too close to an open fire or attempt to light a cigarette until they are absolutely certain that all gas has escaped from their clothing or until they have changed clothing. In the case of gasoline vapors, clothing should be removed before getting near an open fire or striking a match.

An employee was seriously burned while testing a large capacity positive meter inside a meter house. Up until that time the meter power discharged inside the building, if the meter was located in one. Our safety department had previously recommended that the critical flow meter have an extension attached to discharge outside the building. We were informed that such an extension would result in too great an error in the tests. After the fire just mentioned, further tests were made and it was discovered that the percentage error was actually so small that it was negligible.

Tools and Equipment

I do not believe that there is sufficient data available on the so-called "spark proof" tools to prove that they are of any material help in preventing fires. On the other hand, experience has shown that fires have been started from those tools. I think that our metallurgists and engineers have yet to turn out a "spark proof" tool.

In low pressure work, adequate gas main bags and safety gas main stoppers should be kept on hand and maintained in good condition at all times and should be used when needed.

For high pressure lines, vents to fit the various size lines should be part of the working tools and should also be used when needed.

Gas main bags and stoppers are very commonplace to gas men but vents have only been in general use for a few years. It is rather difficult to get a gate valve to make a complete shutoff, with the result that when a section of a line is put out of service, there will nearly always be some gas leaking by the gate. When the line is cut for replacing pipe or for replacing or installing a fitting, some gas will

A. W. Breeland

A MEMBER of the American Society of Safety Engineers, Mr. Breeland presented this paper at the National Safety Congress in Chicago in October, 1946. He has had a long career in promoting safety in gas operations, having been named supervisor of safety at Lone Star in 1929 after working his way up through various positions in the gas measurement and operating departments of the company.

always escape. Fatal fires have resulted from accidental ignition of this gas.

Our present pipe vents are made somewhat as follows: A center ring is split circumferentially. To the half of the ring a circular plate is welded. The plate is center-tapped and threaded, one or two inches, depending on the size pipe line on which it is to be used. Two straps are then welded onto the outer edges of the circular plate, directly opposite each other and tapped for standard size dresser bolts.

The installation of the pipe is made as follows: First slip a dresser follower and then a gasket over the end of the pipe, place the cap in position, bolt up the two bolts, screw an ell into the end of the cap, screw in a short joint of pipe. All escaping gas will then be vented into the air, well above the bell hole.

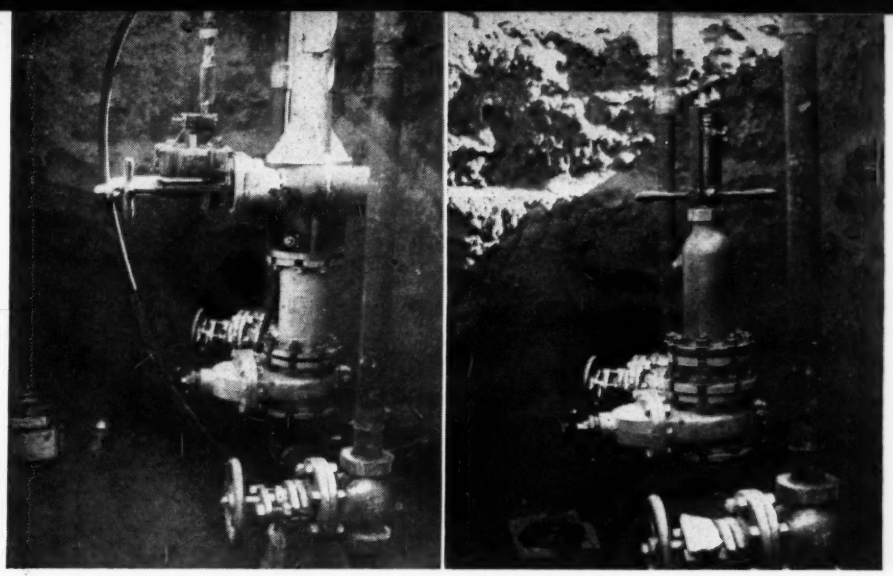
Of course this requires workmen to be exposed to the escaping gas during the short interval while the vent is being installed and also between the time it is removed and the line is reconnected. On change-outs this vent materially reduces the time of exposure. It is necessary to have vents for each size line.

We have had several unexplained pipe line fires. One of the worst occurred in 1940. The investigation of this fire was very thorough and we felt that we ruled out all of the possible sources except that of a spark from either a static charge or stray current. An interurban and a high tension power line crossed this line at right angles a few hundred yards from the point of the fire. The gas was ignited just after the line was separated.

As a result of that experience, all of our transmission line crews are equipped with bonding clamps and cables and are instructed to make a bond around any cut which is to be made, before the line is separated. This eliminates one source of ignition.

All compressor buildings, measuring and regulator installations, gas-making plants, and any building or location where gas is likely to be unconfined and where illumination is necessary must be equipped with explosion-proof electrical equipment. Battery operated hand lamps and flashlights which are used in gas and gasoline vapors should also be of the approved type.

For years we have had tapping machines for tapping low pressure lines but it was only a very few years ago that one was successfully developed for tapping high pressure lines. This apparatus not only makes taps on high pressure lines without any leakage of gas, but, with the aid of this equipment, plugs, which serve the purpose of plug or gate valves, may be installed in lines under pressure allowing a section of pipe to be replaced without exposing workmen to gas and without service interruptions.



The Mueller tapping machine. At left, in place and operating. At right, fitting after installation complete. After repairs are made, flange lying on ground in right photo is bolted to top of flange which has been welded to line, becomes permanent fixture.

Plan of Procedure

As an example of the necessity of a plan of procedure, let me illustrate our own company's plan of procedure for repairing leaks on transmission lines.

When a leak has been detected or reported, the man in charge, usually a district foreman, will either have his assistant investigate the leak to determine the kind of repair necessary or will make the investigation himself. When the foreman investigates the leak, which usually requires digging out to determine the nature of leak and the kind of repair required, he should decide (1) whether it can be repaired under full pressure, (2) whether it should be repaired under reduced pressure, (3) or whether the line must be shut down completely.

Before the foreman decides whether or not to repair the leak under pressure, he should determine as nearly as possible whether the leak is from internal corrosion, external corrosion, sand holes or split pipe. Since the bottom of the line is most vulnerable to corrosion, either from inside or outside, many leaks are found on the bottom of the pipe.

Lap-welded pipe was used in many of our older lines and since little attention was paid to the position of the seam in the line, it becomes increasingly more important that the man in charge of the repairs be able to determine whether the leak is in a seam. If so, it will then be necessary to determine whether the leak results from internal corrosion, external corrosion, or a split, before deciding whether repairs may be made safely under pressure.

In the event the leak is in or near a dresser-coupling or sleeve, it is extremely important to determine how much pipe is still under the coupling or sleeve before attempting to do very much under pressure.

When there is doubt in the mind of the supervisor as to whether the repairs may be made under full pressure, he should either call for reduced pressure or for a complete shutdown.

When the foreman has completed his examination, he should instruct a repair crew to assemble proper tools and equipment and to make repairs.

In addition to the necessary material and tools for making repairs, the truck or pickup should be equipped with first aid kits, respirator, dry chemical fire extinguisher, an adequate supply of goggles, and spark resisting picks and hammers.

In the event it is necessary to remove one or more joints of pipe, fitting, or to cut the line for any purpose, the repair crew will take a grounding line with connections and pipe vents.

Because of the ever-present possibility that a pipe line will act as a conductor for static electricity, stray currents from power lines, or soil current, and the resulting spark when the line is severed or re-connected, a bonding line should be securely fastened to the line on both sides of the proposed cut before the line is separated and reattached before re-connecting. This eliminates one source of ignition.

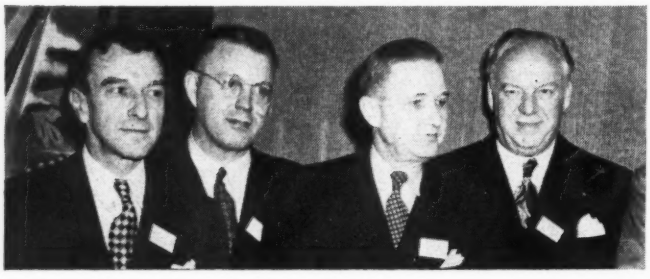
In the event of a replacement of pipe or fitting requiring the line to remain open for some interval of time, for the purpose of cleaning up or enlarging the ditch or bell hole, the gas escaping from either end of the pipe should be vented out of the ditch bell hole so that it may be dissipated in the atmosphere, thus eliminating the hazard of fire or explosion while the work is being done.

SPOTLIGHTING LUMINARIES AT PITTSBURGH

LEADERS at the Eastern Natural Gas Regional Sales Conference: E. Carl Sorby, vice president, George D. Roper Corp.; N. E. French, Equitable Gas Co.; A.G.A. President R. H. Hargrove; F. B. Jones, Equitable Gas Co., conference chairman.

SPEAKERS Lyman Hill, Servel; G. T. Stevens, Eureka Williams Corp.; W. B. Hewson, The Brooklyn Union Gas Co.

HOME SERVICE: Helen Kirtland, Ohio; Kathryn Barnes, Equitable; Jessie McQueen, A.G.A.; Flora Dowler, Manufacturers.



A.G.A. OFFICIALS J. W. West, Jr., left, and C. W. Person, third from left with Sol Weill, Servel, and Sorby.

THE SEVERSONS: Ruth, Peoples of Pittsburgh, and S. V. Severson, Republic of Buffalo; with Helen Kirtland.

FROM CHICAGO and Pittsburgh: W. H. Wise, manager, sales engineering, Peoples Gas; R. Little, Equitable sales manager.

PRESIDENT HARGROVE holds the floor in chat with Irving K. Peck, Manufacturers, Pittsburgh, and Stevens.

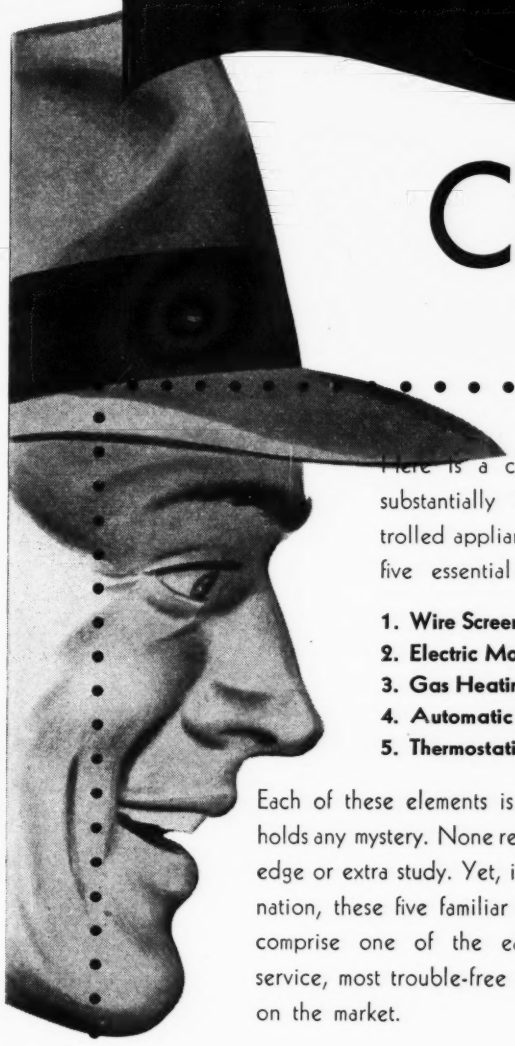
GET YOUR

Service Man's Slant

ON THE *Hamilton*

AUTOMATIC

Clothes Dryer



Here is a conveniently designed, substantially built, precision controlled appliance, composed of only five essential elements. They are:

1. **Wire Screen Drum**
2. **Electric Motor**
3. **Gas Heating Element**
4. **Automatic Timer Switch**
5. **Thermostatic Heat Control**

Each of these elements is an old friend. None holds any mystery. None requires any new knowledge or extra study. Yet, in combination, these five familiar elements comprise one of the easiest to service, most trouble-free machines on the market.

You know how badly your service men are snowed under. You know what a tough job they have trying to keep years-old appliances in operation. If you were in the service man's shoes, wouldn't you welcome the installation of Hamilton Automatic Clothes Dryers in your area . . . knowing their record on low maintenance needs . . . knowing how simple it is to set them right on the rare occasions when they do need service? Of course you would.

Write for full details.

GAS MODEL: For manufactured, natural, mixed or bottled gas. Requires 20,000 BTU input.

World's Largest Manufacturer of Equipment for the Professions

Hamilton

MANUFACTURING COMPANY

TWO RIVERS, WISCONSIN

Gas Shortage Fails To Dispirit Eastern Natural Sales Conference

IN a two-day session bristling with theoretical and applied information on how best to sell natural gas, but in a setting that was even then experiencing the most acute shortage of that fuel in the industry's history, the Eastern Natural Gas Sales Conference, sponsored by the residential gas section of the American Gas Association was held in Pittsburgh, Pa., on Feb. 13 and 14.

Exuding optimism and confidence that in the fullness of time there will be ample gas to sell, and appliances to burn it in, the speakers on the program devoted themselves to examination and recommendation of the problems and policies, the tricks and the techniques that will one day be required to maintain present load and to increase the acceptance of gas by a still greater following of satisfied customers.

Hot water, refrigeration, house heating, and cooking were all dealt with in individual papers presented by experts in these several fields. The theme, current since before the end of the war, that the sellers' market soon would end was again stressed by many speakers, who urged their audience to be prepared for the day when buyers would again become selective and competition would once more be the life of trade.

An overall statement of "Industry Problems and Roads to Progress" was contained in the keynote address of A.G.A. President R. H. Hargrove who listed the major present-day problems as: shortage of appliances, inadequate gas for peakload demands, need for improved relations, and new programs required to maintain and increase the domestic gas load. Hargrove recommended a program of economic research into markets to parallel the scientific research that is already being carried on in respect to gas and appliances. He urged that thorough employee training programs be instituted, that the technical gas research program be continued, and finally that the industry resist and circumvent legislative encroachment primarily through a policy of aggressive self-selling to the public.

Opportunity and Obligation

The rapid growth of automatic domestic appliances, notably the cycle type of home laundry machine and the mechanical dishwasher, were declared by W. J. Schmidt, general sales manager of the Long Island Lighting Co., to present a new opportunity and a new obligation on the part of the gas utilities to sell automatic water heaters of a size and capacity suitable to take care of the demands of these new devices. When normal production is again resumed, washing machine manufacturers expect to sell 3 to 4 million machines per year. This volume, said Schmidt, would mean that 10% of all homes in the U. S. would need water heaters with new specifications if they were to be properly supplied according to the equipment installed. "Any heater that cannot provide 60 to 75 gallons of 160° F. water at the heater during the first hour of draw must be considered inadequate by today's standards of laundry and dishwashing techniques," he told his audience.

Raymond Little, general sales manager of the Equitable Gas Co., Pittsburgh, discussed the problems incident to the selling and maintaining of a balanced house heating load, and the implications on the peak demands that such a type of service entails. Another aspect of the house heating problem was presented by W. H. Wise, manager, sales engineering, Peoples Gas Light and Coke Co., Chicago, who spoke on "A Solution for the Conversion Burner Problem." Seeing the poorly engineered, inefficient or unsafe conversion burner as a detriment to the industry, Wise recommended a program of strict inspection and testing of all such types of equipment, and the refusal of service to any job that was deemed unsafe. A firm utility program, in his opinion, should start with the adoption of a specific policy of requirements.

Lyman Hill, director of sales research, Servel, Inc., pointed out the relationship between "Good Market Research and Low Cost Sales." His principal theme was that since gas costs have lowered only 16% in the last 15 years, during which time electric costs have fallen by 50%, the margin of price differential that at one time was the gas industry's chief line of defense against electrical competition has diminished. The present monthly cost differentials between gas and electricity for cooking, water heating, and refrigeration are now too small to be the main deciding factor in the customer's selection of a competing service. "Market research," said Hill, "is most valuable in that it reduces the area of individual judgment in making selling decisions and establishing sales policies."

"Three Hundred Million Messages," the total coverage contemplated in the A.G.A.'s 1947 advertising campaign, was presented by W. B. Hewson, The Brooklyn Union Gas Co., a member of the association's national advertising committee.

Urging the necessity for still larger national campaigns, Hewson said national gas advertising should have $1 million more per year, and he advised gas company executives to "put the heat on gas appliance manufacturers" to the end that the manufacturers resume the $400,000 support that was given the A.G.A. campaign two years ago through contributions from GAMA members.

A top-notch vacuum machine salesman, and an expert in the distributor-dealer type of selling operation, G. T. Stevens, executive vice president of Eureka Williams Corp., discussed "Retooling for Sales Leadership." Pointing out that there is more to retooling an industry than readapting its mechanical equipment, he applied retooling as a necessity in shaping new sales programs, and in training new selling personnel. Discussing the mistakes as well as the achievements of his own company, he admitted the failure of one advertising campaign that was pitched to the tune of factory accomplishment instead of consumer demands.

E. Carl Sorby, vice president of Geo. D. Roper Corp., came up with an entertaining talk, "Meeting the Automatic Cooking Challenge with Gas."

Home Service in Action

A considerable portion of the Friday morning session was devoted to the theme of "Home Service in Action," a presentation in two parts introduced by Flora Dowler, home service director of The Manufacturers Light and Heat Co., Pittsburgh. Miss Dowler introduced Kathryne Barnes, home service director of the Equitable Gas Co., Pittsburgh, who told how "Home Service Participates in New Freedom Gas Kitchen Program." Miss Barnes declared that the kitchen is again becoming the heart of the American home. From the practical viewpoint of gas appliance manufacturers' interests, she warned that too much emphasis on elaborate cabinet equipment might have the effect of lowering the unit value of appliances sold, since many kitchens are planned on a gross overall budget that cannot be expanded.

A. D. Howard, assistant sales promotion manager, Servel, Inc., in an

HARDWICK Gas RANGES

are priced to suit 8 out of 10

TOO EXPENSIVE FOR ONE

JUST RIGHT FOR EIGHT

NOT ENOUGH GADGETS, NOT EXPENSIVE ENOUGH FOR ONE

Cooking performance

to please everyone

HARDWICK STOVE COMPANY
CLEVELAND, TENNESSEE
THE QUALITY LINE SINCE '79

illustrated paper, "Gas Refrigeration Today and Tomorrow," traced the history of the gas refrigeration industry since the introduction of Servel some 20 years ago. He followed the theme introduced by preceding speakers in advocating immediate preparation of salesmen for the cultivation of the competitive market that lies ahead, and offered the salesman selection plan of his company as a basis for recruiting an adequate sales force. Of particular interest to the audience was the unveiling of the 1947 model Servel refrigerator, with its large frozen food compartment (60 packages) its moist air food storage space, and the principle of baffling which gives interior cold control and limits the necessity of defrosting to two or three times a year.

Donald Thompson, vice president in charge of research, Federal Reserve Bank of Cleveland, Ohio, speaking on the subject, "People and Money," anticipated at an early date a return to installment buying of major appliances. With approximately $10 billion outstanding in consumer credit today, it is his belief that another $10 billion can be added, half of which may go for the financing of purchases of heavy consumer durable goods, including gas appliances.

An old time door-to-door artist. A. C. Fox, district manager of the Fuller Brush Co., Pittsburgh, Pa., gave a brass tacks talk on selling as a science. "You can't build a sales force out of driftwood," he warned.

Chairman of the conference was F. B. Jones, manager of sales and market research, the Equitable Gas Co.

Firm Policies Studied At Personnel Meeting

The Phillips Hotel, Kansas City, Mo., was the site of the 12th meeting of the A.G.A. Midwest Personnel Conference on Feb. 6. Discussions were centered around the reporting of policies and experiences of the companies represented, in an effort to help each firm crystallize policy action based on actual experience.

Developments in national industrial relations were reported by Kurwin R. Boyes, secretary of the American Gas Association. The secretary of the conference, H. H. Duff, personnel director, Panhandle Eastern Pipe Line Co., reviewed the returns of a recent survey of company practices in employee benefit plans.

The Midwest group will meet again in May and September and will hold a combined meeting with the A.G.A. Southwest Personnel Conference in November.

At Midwest Industrial Council

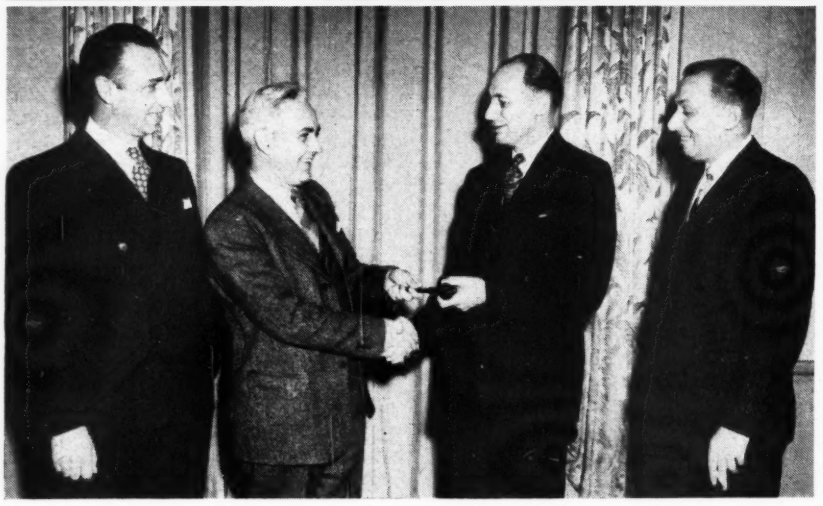
THE applications of gas to various industrial processes were unfolded by four speakers before industrial gas representatives who attended a one-day meeting of the Midwest Industrial Gas Council at the Stevens Hotel, Chicago, on Jan. 24.

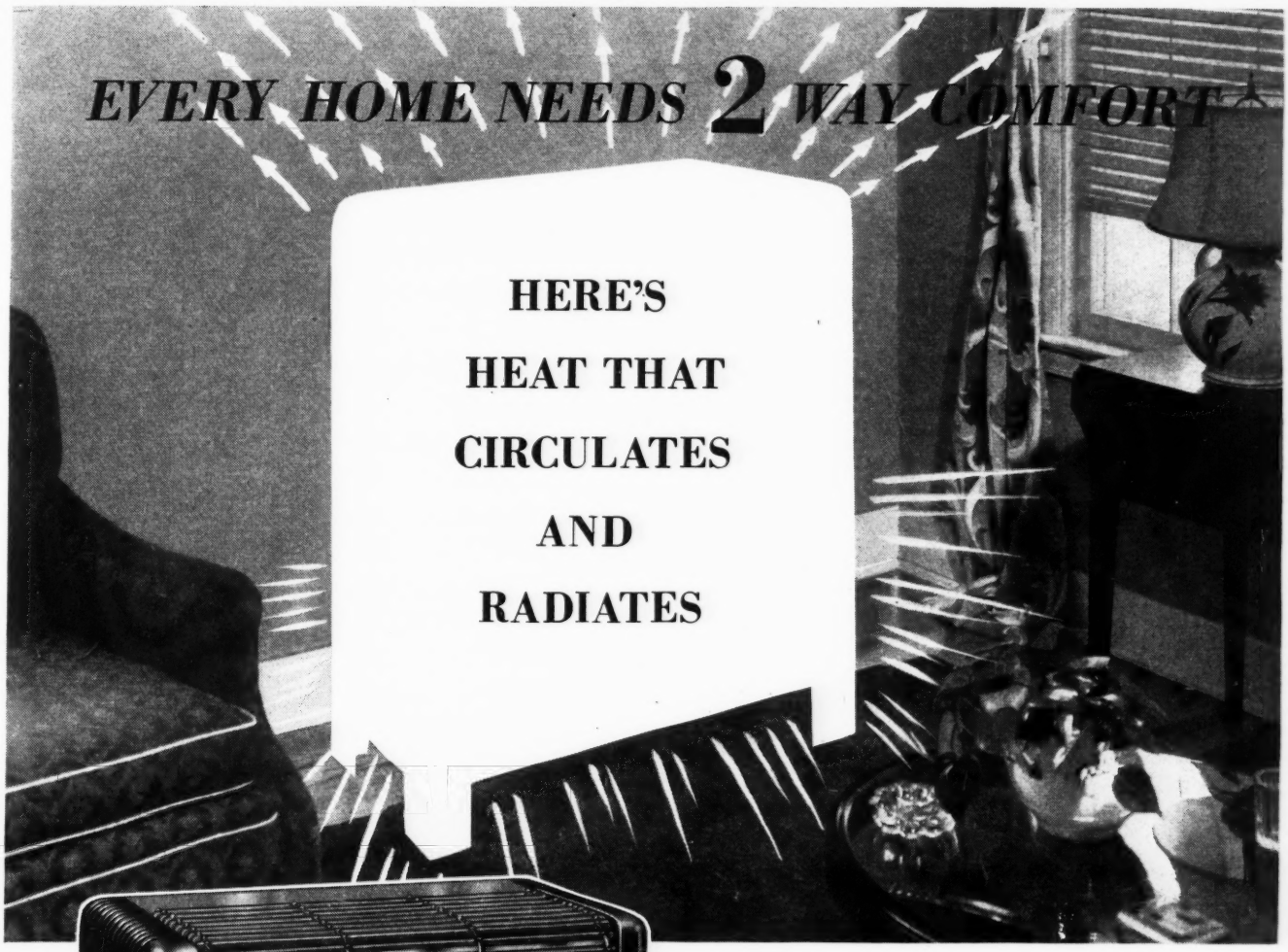
Other highlights of the meeting were the election of three new officers, and an impromptu talk by Capt. E. S. Pettyjohn, recently appointed director of research of the Institute of Gas Technology, who reviewed the work being done by the institute.

Headline speakers and their subjects included: Carl H. Lekberg, Northern Indiana Public Service Co., Hammond, Ind., "The Kolene Process — What it is and What it Means to Industrial Gas;" A. D. Wilcox, industrial engineer, Eclipse Fuel Engineering Co., Rockford, Ill., "Factors to Consider in Galvanizing With Gas," Henry W. Schramm, Standard Furnace Division, Surface Combustion Corp., Toledo, Ohio; "Combustion Systems and Burners;" and S. H. Bivins, Detroit Rex Products Co., Detroit, "Metal Cleaning."

In the upper photo is shown a portion of the luncheon group; reading counterclockwise from the left foreground: N. R. Gorsuch, Citizens Gas and Coke Utility, Indianapolis, Ind.; L. H. Verschoor, Michigan Consolidated Gas Co., Grand Rapids; H. A. Clark, Michigan Consolidated, Detroit; H. H. Feierabend, Northern Indiana Public Service Co., Gary; Wilcox and Schramm; H. F. Rehfeldt, Peoples Gas Light & Coke Co., Chicago; Capt. Pettyjohn; and W. N. Blinks, General Gas Light Co., Kalamazoo, Mich.

In the lower photo, Rehfeldt, retiring chairman, second from right, hands the gavel to the incoming chairman, Vance Uhlmeyer, Iowa-Illinois Gas & Electric Co., Moline, Ill., while Don Groff, Northern Indiana Public Service Co., Hammond, new vice chairman, and P. V. Gibson, Western United Gas & Electric Co., Aurora, Ill., secretary-treasurer, look on.





HUMPHREY RADIANTFIRE

Circulator

1 Here is RADIANT heat — sunlike heat that instantly warms the floor with penetrating rays.

2 Here is CIRCULATED heat — heat that circulates cheery warmth to every corner of the room.

For downright heating comfort a Humphrey Radiantfire Circulator is unexcelled. This efficient, gas burning heater delivers radiant heat which travels at the speed of light to warm everything in its path, plus an abundance of circulated heat that searches out every chilly zone and converts it into a cozy, livable area. Painstaking workmanship and quality materials assure lasting customer satisfaction and build valuable goodwill for you.

A HUMPHREY PRODUCT

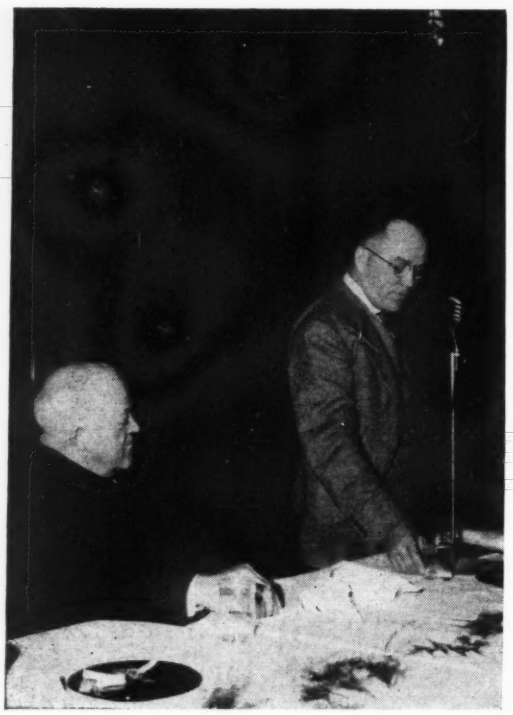
GENERAL GAS LIGHT COMPANY KALAMAZOO MICHIGAN

DISTAFF DOINGS

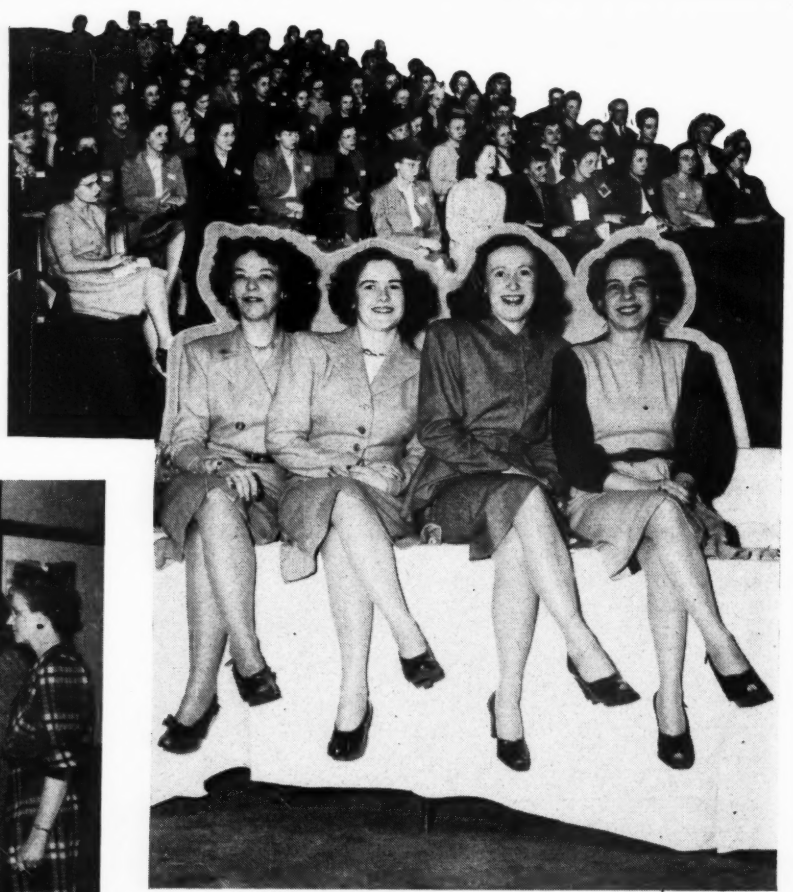
Take The Spotlight

Camera Record of A.G.A. Home Service Workshop Cincinnati, Ohio Jan. 20-23

AT THE MICROPHONE, Mrs. Mary Belle Burnett, chairman, A.G.A. Home Service Committee, and home service director, The Cincinnati Gas & Electric Co., presides at a luncheon meeting. At right, Walter C. Beckjord, president, Cincinnati Gas, and Jessie McQueen, A.G.A. home service counsellor.



WELCOMING THE DELEGATES: At the microphone, Beckjord; at left, Cincinnati's mayor, James Garfield Stewart, who also addressed the group.



THE BAKING EXHIBIT is explained by its creator, Joan Huck, A.G.A. Lab, to Lucille Newlin, Oklahoma Natural Gas Co.; Helen Kirtland, Ohio Fuel Gas Co.; and Mary Belle Burnett, convention chairman.

TIME OUT for Ruth Severson, Peoples Natural, Pittsburgh; Jean Montgomery, The Ohio Fuel Gas Co.; Marilyn Miller and Mary Swiston, Peoples Gas Light & Coke Co., Chicago.

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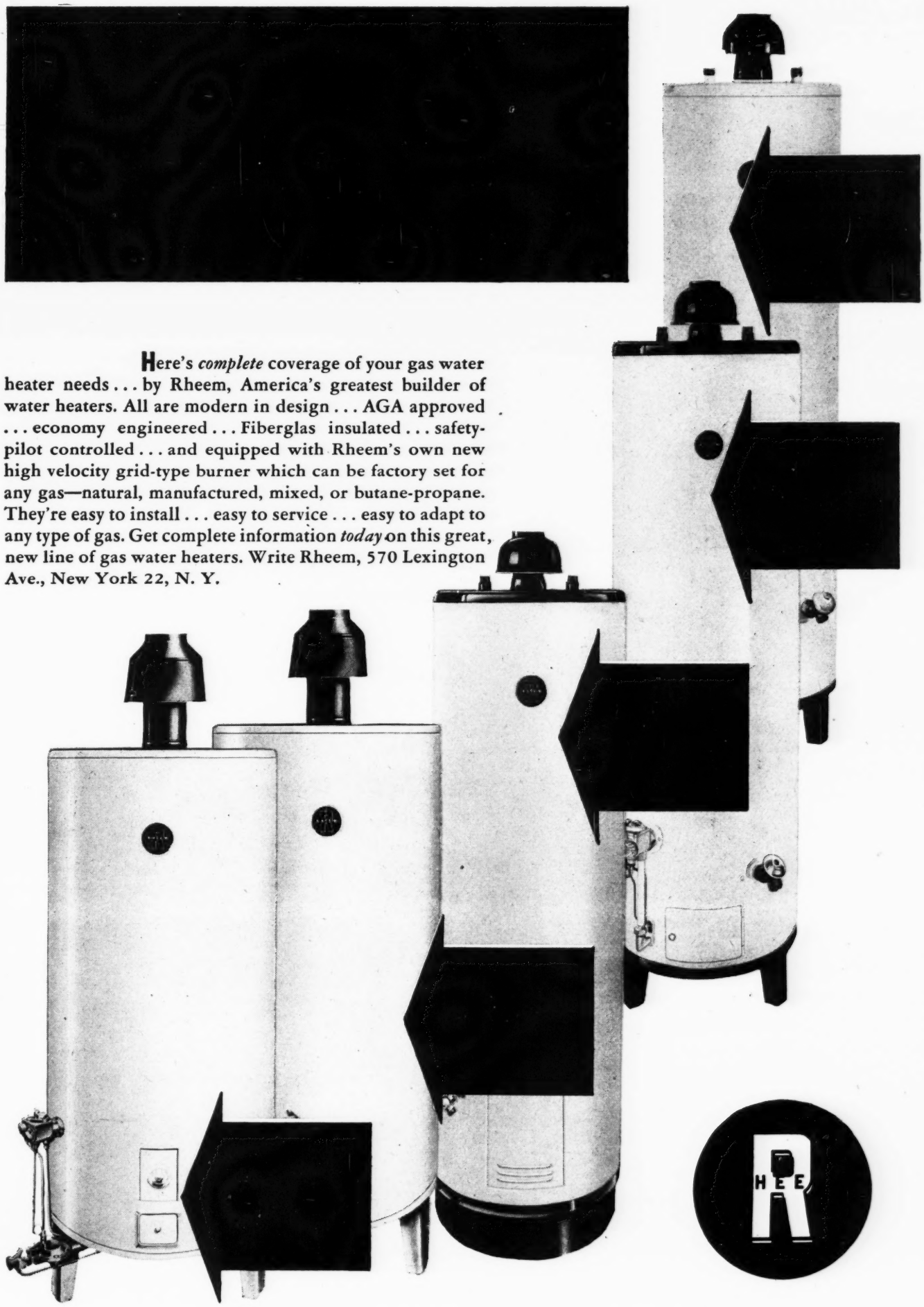


Products, Techniques, Operation Studied at Home Service Workshop

TWO hundred home service directors from 28 states gathered in Cincinnati, Ohio, Jan. 20-23, at the A.G.A. Home Service Workshop, to listen to experts discuss ways of making their branch of the industry "help to sell gas." Under the leadership of Mrs. Mary Belle Burnett, home service director of the Cincinnati Gas and Electric Co., those in attendance at the three-and-a-half day meeting probed into new appliances, learned new angles in home service operation, watched demonstrations of proper techniques, and joined in discussion groups to iron out specific problems.

In the line of product information, "The Fourth Cooking Zone," clock control, CP ranges, baking complaints, automatic storage water heaters, refrigerators, kitchen planning, New Freedom Gas Kitchens, and cooking equipment for school rooms were studied.

In the field of operation, special attention was given to the problems facing new employees in the work. One entire session was devoted to getting started in home service, and one-girl organizations as well as district systems were considered. The organizational talks were supplemented by progress reports on a "cadet" program for home service, and 5-minute talks on various phases of the work.

Techniques were displayed in a skit titled "New Talent Evaluates the Home Call," presented by Betty Rauch, Mansfield, and Lois Snyder, Coshocton, both employees of the Ohio Fuel Gas Co. Colleen Fowler, Gas Service Co., Kansas City, Mo., suggested new "Demonstration Ideas," and Mary Huck, Ohio Fuel Gas Co., Columbus, introduced a kit for demonstrations in dealer stores. How to set up food photographs was shown with the aid of slides by Ruth Soule, The Brooklyn Union Gas Co. Alice Blinn, associate editor, Ladies Home Journal; Helen Kirtland, Ohio Fuel Gas Co. director of home service, and Jessie McQueen, A.G.A. Home Service Counsellor, were other speakers during this phase of the program.

The discussion period was divided into four groups: The System Department, led by Mildred Clark, Oklahoma Natural Gas Co., Tulsa; City Departments, with Esther Cleary of the Rochester (N. Y.) Gas and Electric Corp., in charge; "New" One-Girl Departments, under direction of Mary Alice Crosson, Citizens Gas and Coke Utility, Indianapolis, Ind.; and "Experienced" One-Girl departments, headed by Louise Anderson, Iowa Power and Light Co., Des Moines.

CALENDAR OF ASSOCIATION ACTIVITIES

March

American Society of Mechanical Engineers Spring Meeting—Tulsa, Okla., March 2-5.

American Gas Association Residential Gas Section, Mid-West Gas Sales Conference—Edgewater Beach Hotel, Chicago, March 17-18.

A.G.A. Sales Conference on Industrial and Commercial Gas—Copley-Plaza Hotel, Boston, March 17-19.

New England Gas Association—Boston, March 20-21.

Gas Appliance Manufacturers Association, Hotel Restaurant & Commercial Gas Equipment Division—Stevens Hotel, Chicago, March 24.

National Restaurant Association Convention — Stevens Hotel, Chicago, March 25-27.

April

American Gas Association—Edison Electric Institute Accounting Conference—Hotel Statler, Buffalo, N.Y., April 7-9.

Mid-West Gas Association Annual Meeting and Convention — Hotel Paxton, Omaha, Nebr., April 7-9.

National Association of Corrosion Engineers Annual Convention—Palmer House, Chicago, April 7-10.

American Gas Association Distribution and Motor Vehicle Conference—Hotel Cleveland, Cleveland, Ohio, April 14-16.

Gas Appliance Manufacturers Association Annual Meeting — Drake Hotel, Chicago, April 14-16.

American Gas Association, Southwest Personnel Conference—Buena Vista Hotel, Biloxi, Miss., April 16.

Southern Gas Association—Biloxi, Miss., April 16-18.

Natural Gasoline Association of America, 1947 Convention—Baker Hotel, Dallas, April 23-25.

Gas Meters Association of Florida-Georgia — Boca Raton, Fla., April 25-26.

U. S. Chamber of Commerce Annual Meeting—Washington, D. C., April 29-May 1.

American Gas Association Natural Gas Department Spring Meeting—Stevens Hotel, Chicago, April 30-May 1.

May

Industrial Gas School—Hotel Seneca, Columbus, Ohio, May 5-9.

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, Okla., May 6-8.

Commercial Gas School—Washington D. C., May 12-16.

Indiana Gas Association—French Lick Springs Hotel, French Lick, Ind., May 15-16.

Pennsylvania Gas Association — Wernersville, Pa., May 20-22.

Gas Appliance Short Course—University of Tulsa, Tulsa, Okla., May 27-30.

June

American Gas Association Joint Production and Chemical Committee Conference—Hotel New Yorker, New York City, June 2-4.

Canadian Gas Association—General Brock Hotel, Niagara Falls, Ontario, Canada, June 9-11.

American Society of Mechanical Engineers, Semi-Annual Meeting—Chicago, June 16-19.

American Gas Association Residential Gas Section, New York-New Jersey Gas Sales Conference—Essex and Sussex Hotel, Spring Lake, N.J., June 23-24.

July

Michigan Gas Association—Grand Hotel, Mackinac Island, Mich., July 7-8.

September

American Society of Mechanical Engineers, Fall Meeting—Salt Lake City, Utah, Sept. 1-4.

Pacific Coast Gas Association 1947 Convention—Coronado, Calif., Sept. 23-25.

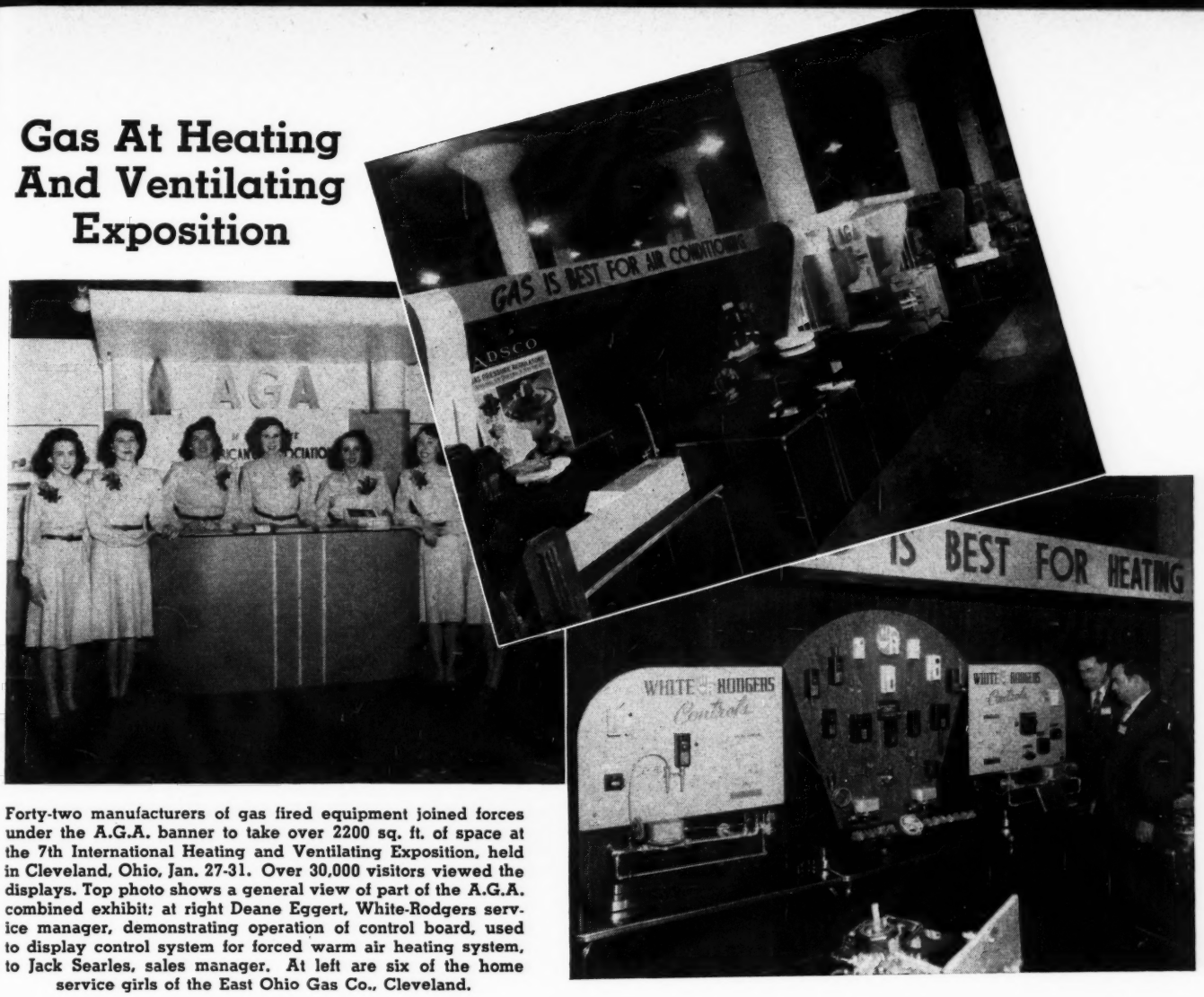
American Gas Association Annual Convention—San Francisco, Calif., Sept. 29-Oct. 3.

Industrial, Commercial Men Meet in Boston

INDUSTRIAL and commercial gas men are headed for Boston this month, where the three-day A.G.A. Sales Conference on Industrial and Commercial Gas will be held, starting March 17, at the Copley-Plaza Hotel.

Feature speaker on the luncheon program for March 18, combined commercial and industrial day, will be Dr. George R. Harrison, dean of science, Massachusetts Institute of Technology.

Gas At Heating And Ventilating Exposition



Forty-two manufacturers of gas fired equipment joined forces under the A.G.A. banner to take over 2200 sq. ft. of space at the 7th International Heating and Ventilating Exposition, held in Cleveland, Ohio, Jan. 27-31. Over 30,000 visitors viewed the displays. Top photo shows a general view of part of the A.G.A. combined exhibit; at right Deane Eggert, White-Rodgers service manager, demonstrating operation of control board, used to display control system for forced warm air heating system, to Jack Searles, sales manager. At left are six of the home service girls of the East Ohio Gas Co., Cleveland.

who will discuss "Industry and the Atom."

Other specialists who will address the conference include Col. Paul Logan, National Restaurant Association; William Broeg, food consultant; Frank H. Adams, president, Surface Combustion Corp.; Capt. E. S. Pettyjohn, research director, Institute of Gas Technology; and Ernest Henderson, president, Sheraton Hotels.

Chairman H. A. Sutton, assistant general industrial fuel representative of the Public Service Electric & Gas Co., Newark, N. J., outlined the technical phases of the program as follows:

COMMERCIAL GAS DAY

Monday, March 17

1. Trends in Food Supply—The effect on the food service industry caused by changing conditions in the supply of fresh, frozen, dehydrated and canned foods.
2. Modern Trends in Commercial Kitchen Planning.
3. How Should the Type and Quantity of Commercial Cooking Equipment Be Determined?
4. Our Stake in Other Commercial Sales in the Main Street Stores.
5. Commercial Cooking Equipment.
6. Selling Gas to Bakeries.
7. How Various Foods Are Best Cooked.
8. Sanitation in the Restaurant.

GENERAL MEETING ON INDUSTRIAL AND COMMERCIAL GAS

Tuesday, March 18

1. Research.
2. Commercial Gas Cooking Sales Promotion.
3. Industry-Wide Cooperation Brings Results.
4. What Gas Means to the Copper and Brass Industry.
5. What a Customer Demands and Expects From the Gas Company.
6. Are We Still Salesmen or Did We Lose Our Touch During the War?
7. The Impact of Changed Economic Conditions on the Competitive Position of Gas.
8. Trends in Production and Distribution and Their Possible Effect on Large Volume Gas Sales.

INDUSTRIAL GAS DAY

Wednesday, March 19

1. The Design and Use of Ovens With Special Reference to Safety.
2. Modern Sales Technique Covering Large Air Heater Applications.
3. Drying Ovens With Low Temperature Radiant Panels.
4. New Fields for Prepared Atmospheres.
5. What to Look for in the Ferrous and Non-Ferrous Metal Industries.
6. Our Position in Wholesale Baking.
7. How to Sell Gas in Textile Processing.
8. Heat Applications in Precision Casting.

NEGA Meeting Follows A.G.A. At Boston

Topics and speakers for the New England Gas Association Annual Business Conference, to be held March 20-21 at the Statler in Boston have been selected from 129 suggestions offered by New England gas company managers. The program committee, headed by Chairman A. V. S. Lindsley of Waterbury, spent an entire day choosing the most timely suggestions from those presented. Addresses by the presidents of A.G.A. and NEGA, the first vice president of GAMA, and the NEGA executive secretary will supplement the other scheduled talks.

The directors of the A.G.A. have voted to meet in Boston in conjunction with the NEGA meeting, and the A.G.A. Commercial and Industrial Sales Conference is to be held on the preceding three days. The NEGA program committee has invited A.G.A. to present a comprehensive exhibit of printed material at its meeting.

TECHNICAL TRENDS

By GUY CORFIELD

Activated Carbon

ACTIVATED carbon is a type of material with characteristics and behavior that make it of considerable interest to the gas industry. It is prepared from carbonaceous substances such as wood, nut shells, and rice hulls, in two general steps: first, the raw material is carbonized at temperatures below 600° C. with addition of dehydrating chemicals such as zinc chloride or calcium chloride; second, the pulverized or granular charcoal is "activated" by heating at approximately 900° C. in kilns by direct gas firing, under conditions of slight oxidation and in the presence of steam or carbon dioxide and with the addition of other chemicals such as orthophosphoric acid or sodium hydroxide. The preparation temperatures, additives, and techniques can be adjusted to impart controllable properties for special purposes.

The resulting material has, as one general property, a remarkable ability for adsorbing, or retaining within its structure, relatively large quantities of gases or vapors, which can subsequently be removed by application of heat and flushing media. By suitable control, this removal can be done so as to accomplish a separation of light hydrocarbons, analagous to the more conventional absorption-distillation-fractionation and low temperature fractionation processes.

Two recently announced applications are of special interest to the gas industry, and are worth watching for future developments.

One is an industrial process which was described in the January, 1947, issue of GAS, entitled "Hypersorption—A Process for Separation of Light Gases," by Clyde Berg of the Union Oil Co. of California. In this process a moving bed of activated carbon contacts the feed gas stream and separates the components which are subsequently stripped from it by steam. Pure hydrogen can be separated from admixture with methane and small amounts of C_2 and C_3 hydrocarbons. Ethylene can be effectively separated from complex mixtures.

The other application of activated solid adsorbent is a light hydrocarbon analytical apparatus now becoming available under the name of the Turner-Burrell Adsorption Fractionator. This is claimed to be an automatic, simply operated, self-contained unit which will separate, identify, measure and collect the components of light hydrocarbon gas mixtures and record the analytical data. This development will be followed closely by research and testing laboratories.

Totally Aerated Burners

ABOUT three years ago the industry was intrigued by the announcement—and the showing of demonstration models—of totally aerated or so-called "100% primary air" gas burners. It appeared that a real step was possible beyond the conventional Bunsen type gas burner which might result in improvements and perhaps new developments in gas heat applications. Research publications of the American Gas Association Testing Laboratories have outlined the basic principles and indicated possible avenues of utilization of this type of burner, but apparently there has been no inspiration or opportunity to carry the matter further. It is to be hoped that we hear more of this.

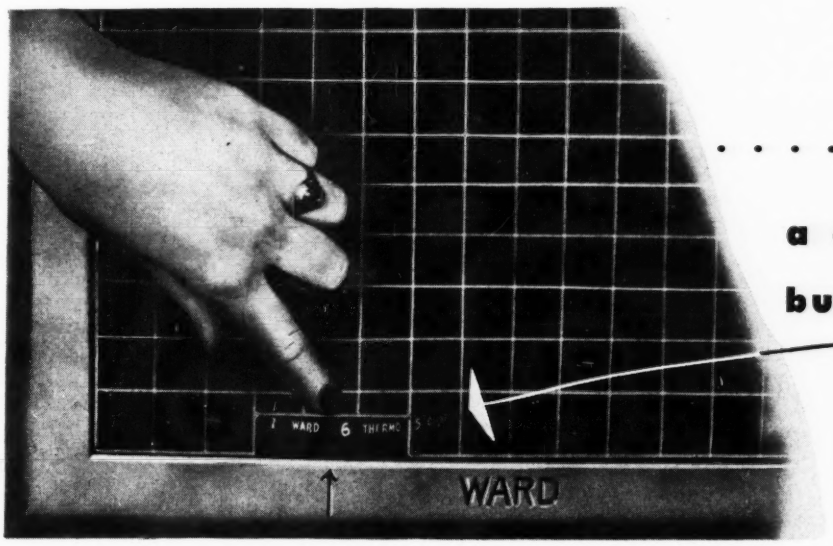
Static Electricity

MOST people are aware of and have observed some of the phenomena and manifestations of static electricity as produced by their normal movements and environment, or by familiar objects or operations. Examples are the crackling noise sometimes heard when combing one's hair, or the faint sparking and the tingling sensation observed when touching a grounded metal object such as an elevator shaft after walking along a hotel corridor, or the slight "shock" received when contacting an automobile that has been in motion. It may not be generally realized that such static electricity receives considerable attention from and presents a definite hazard to many industries; and that the gas industry is by no means immune to its effects and potentialities.

An interesting discussion under the heading of "Ignition by Static Electricity" is presented in the 1946 A.G.A. Technical Section's Report of Subcommittee on Chemical Aspects of Safety. This report was prepared as part of the A.G.A. Chemical Committee report, by a subcommittee under the chairmanship of Dr. Wilbert J. Huff of the United States Bureau of Mines. The discussion starts by saying that "static electricity is an insidious form of ignition danger not generally entirely appreciated," and later states that under certain conditions "a spark intense enough to ignite gas can be drawn from the finger." The data in this report constitute an excellent summary of the presently known general factors influencing the development and control of static electricity.

It appears that many forms of motion and friction may produce static electricity, which under favorable conditions may build up to an intensity sufficient to cause sparking, and that such a spark may be "hot" enough to ignite a combustible gas-air mixture; and that the general means of minimizing the possibility of a conflagration, when the existence of a combustible gas-air mixture is unavoidable, are the maintenance of high humidity to encourage electrical leakage, and the bonding or grounding of all objects, both stationary and movable and including workmen that may be unavoidably engaged in the operation or in the immediate vicinity.

WARD'S NEW, IMPROVED BILT-IN THERMO-CONTROL AND AUTOMATIC PILOT



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A.G.A. reference manual insert sheets containing information and specifications on Ward furnaces are now available. Write us for copies.

Drying and Dehydration of Farm Products

1. Fuels Used for Hay, Grain Driers

By J. W. SORENSON, JR.

Texas Agricultural Experiment Station
A. & M. College of Texas

ARTIFICIALLY curing hay crops has been receiving the attention of farmers, agricultural engineers and other agricultural leaders for the past 25 or 30 years.

However, it is only within the last 10 years that equipment has reached a point even approaching a practical solution of the problem.

Research was started in 1935 by the Tennessee Valley Authority, cooperating with the Tennessee Agricultural Experiment Station, to develop a simple and inexpensive means of curing hay in the barn after it has partially cured in the field. Through a period of years the system now known as the barn "hay finisher" was successfully developed.

This hay finisher system consists of evenly distributing partially cured hay (40 to 50% moisture content) over a system of air ducts. A centrifugal or propeller type fan, driven by an electric motor or a gasoline engine, is connected to the duct system, and forces air up through the hay and removes the moisture.

Large commercial equipment for drying grain has been used to dry rice in California for more than 20 years. Approximately 40 of these units are being used in the rice growing area in South Texas and in the coastal area near Corpus Christi. The University of California developed a successful farm-size, tunnel-type drier for drying rice in sacks. Five or six of these units are in use in Texas for this purpose.

Tests made with the hay finisher system showed that both hay and grain could be dried successfully and economically. However, in drying grain it was found that uniform drying could not be secured with heated air if it was forced through thick layers of grain. For this reason, a second drier, now known as a column drier, was designed, built, and thoroughly tested.

This drier consists essentially of two columns of grain 10 in. thick, with an air chamber between the two columns. Heated air is forced into this chamber and out through the columns of grain. The grain columns consist of screen wire reinforced by ½-in. mesh hardware cloth stretched on 2 x 4-in. frames. These frames, two on each side, are supported in a vertical position to hold the grain in vertical layers, 6 ft. high, 9 ft. long, and 10 in. thick. The only escape for the air, under pressure in the air-tight chamber between the columns, is through the layers of grain.

This type drier proved to give more uniform drying and was more economical for drying grain than the system first tested.

Optimum operating temperatures have not yet been definitely determined; however, the following temperatures have been successfully used:

Hay—all types	**130°F to 190°F**
Combined grain (not to be used for seed)	**130°F to 190°F**
Grain for seed	**120°F or less**
Peanuts	**120°F to 130°F**
Rice—in sacks	**105°F to 108°F**

Almost any type of fuel might be used as a source of heat in the drying system. However, butane and natural gas are probably the most satisfactory sources of heat in Texas. One or the other of these gases is readily available to the farm in normal times, the burneres are inexpensive, the operating cost is reasonable, and the installation does not require a special furnace or heat exchanger. The open flame can be introduced into the extended intake of the fan with very little fire hazard. Simple and inexpensive controls can be provided to cut off the gas if the flame should fail or if the fan should stop.

The farm gas system, either butane or natural, usually operates at low pressures, about 4 oz. In this case, a low pressure type gas burner is required. A burner of this type that has given good results in our experimental work is the McKee Box Burner manufactured by the Eclipse Fuel Engineering Co., Rockford, Ill. These burners are available in rated capacities of from 50,000 to 2,750,000 Btu's per hour.

In the use of the low pressure burners in hay drying installations where the velocity of the secondary air is relatively high, it has been found that the burners will deliver approximately double the catalog rated capacity. For example, if the design calculations indicate the need for a burner with a capacity of 1,000,000 Btu per hour, a burner with a catalog rating of 500,000 Btu per hour will be satisfactory.

Experimental tests indicate that for average drying conditions, the heating equipment should supply approximately 125,000 Btu per hour for each 1000 cu. ft. of air used per minute.

On first thought it would seem that there might be fire hazards in case of fan stoppage or flame failure or if dry leaves, bits of trash or other light material should be sucked into the open flame, ignited, and blown into the drier.

However, the danger from fan stoppage or flame failure can be overcome by the use of automatic controls. These controls consist of a solenoid valve in the gas supply line connected to a thermal unit located in the burner flame, and a "sail" or "butterfly" switch located in the fan intake. During operation, the solenoid valve is held in the "open" position by an electrically energized magnetic coil. If the flame should go out, the thermal element cools quickly and automatically closes the solenoid valve. If the fan should stop, the "sail" or "butterfly" switch automatically causes the solenoid valve to cut off the gas supply.

Furthermore, tests have demonstrated that there is no danger from fire caused by particles of trash being drawn into the open flame. The velocity of the air passing the flame is so great that material being carried in the air stream would not remain in contact with the flame long enough to ignite.

The cost of drying hay and grain artificially depends upon the moisture content of the material at the beginning and end of the curing period, and upon the cost of electricity, fuel, and labor.

As a result of tests made at several

experimental units in Texas, the following figures can be used in estimating the cost of fuel and power:

HAY:

Alfalfa—from 80% to 10% moisture—$6 to $7 per ton
Alfalfa—from 65% to 20% moisture—$2 to $2.50 per ton
Sargo—from 65% to 20% moisture—$2 to $2.50 per ton
Bundled hegari—from 65% to 20% moisture—$2 to $2.50 per ton

GRAIN:

Milo—from 19% to 13% moisture—34 cents per ton
Milo—from 16% to 12% moisture—30 cents per ton
Hegari—from 19% to 13% moisture—31 cents per ton

2. Using Gas To Dehydrate Hay

By GEORGE E. LOCKHART

Arnold Dryer Co., Corpus Christi, Texas

THE raw product is brought to the dryer after it has been cut and chopped by the field harvesters. Here it is fed into the elevator that feeds it into the revolving drum, where it meets the hot gas from the furnace, i.e., 1850° to 2000°. This inert gas has the oxygen and combustion odors destroyed. The inert gas and the green forage enter the drum at the rate of 10 Mcf per minute; as soon as the green product comes in contact with the hot gas, every particle of the green product becomes enclosed in a cloud of steam, which insulates it and protects the vital feed units from being destroyed.

In our type drier, this process is as follows:

The suction blast of 10 Mcf per minute carries the material 24 ft. in the first drum. Then it turns and comes back to the furnace and in a drum which surrounds the first or hot drum for its entire length. This drum has four times the cubic capacity of the first and serves the additional purpose of insulating the first drum. At this point, it again turns and enters the final drum, which is 8 ft. in diameter and has four times the cubic capacity of the preceding drum. Through this system the progress is continually expanded and retarded and the heat throughout all of this 72 ft. travel in the inert gas is lowered. In this distance we lower the temperature from the initial 1850 to 2000° F. to the outlet temperature of 250 to 300° F. We have used up all the heat units in this time, porting only about 250°.

The drum should revolve approximately 10 times per minute so as to allow the product being processed to be carried up and dropped through the hot gas. The process takes approximately two and one-half minutes.

As the product leaves the drums, it goes into the big fan and is forced up into the main collector where it is whirled around, and the moisture, in the form of steam, is separated from the dry material. The material at this point is called chop and is too hot to bag (being around 110°). It is picked up by what is called the cooling fan and, with fresh air, is blown up into the cooling collector where it is again whirled around. It comes down into the bagger if chop is wanted, or into the hammer mill where it is ground to the size desired. The whole operation from elevator to discharge from the hammer mill is about three and one-half minutes.

This process is very much like the quick freeze process. The quick freeze does not burst the cells in the product to be processed, and with our type of dehydration, the high temperature inert gas draws the moisture out of the material so fast it leaves the plant juices in the form of a syrup in which are found vital feed units of carotene and protein. In this system the material does not reach a higher temperature of 110 or 115°, due to being installed in the cloud of steam.

To dehydrate properly, the material must be cut, in short lengths, ½ to ¾ in, by very sharp knives. As the moisture must come lengthwise through the stem, it must be cut and not bruised off. The product must never touch the ground, but must be cut with a machine that mows and elevates the material end-to-end into the chopping unit; thus is assured a uniformly cut material. The sooner the material reaches the drier after leaving the stubble, the better and richer product will be found. The process just outlined is the same as for all forage crops. The shorter the lengths when cut, the higher rate of dehydration and the better quality of the finished product. Root crops and citrus peel call for special treating equipment, but the drying process is just the same.

3. Types of Farm Dehydrators

By ESTIN C. WHIPPLE

Agricultural Agent, Santa Fe Railroad, Galveston, Texas

MANY varieties of dehydrators are used with success in hay dehydration. The large tunnel dehydrator has proved good for rapid dehydration, up to 270 tons of alfalfa per day having been processed. Other dehydrators of the cylinder variety have proved equally good. The tunnel machine, cylinder units, and small farm barn units, a variation of the tunnel dehydrator used for fruits and potato slices, show good results in tests.

The hay is cut and allowed to sundry a few hours until moisture content is near 40% to 50%, but above the point where the leaves shed—39%. This enables farmers to produce a higher quality hay and do it under adverse weather conditions.

The cylinder dehydrators seem to be practical. In the tumbling effective dehydration is made possible and the tendency to break up the hay in the tumbling does not take from the quality. Various makes of dehydrators, including the Hess, Arnold, Beaird, and others, are doing a wonderful job. The farm unit designed by the experiment stations and colleges is doing an excellent job in dehydration of hay, rice, peanuts, etc. The farm tunnel unit designed for sacked rice, peanuts, and other farm products, has made successful tests and is in use on many farms in the Gulf coastal area. The air center column dehydrator has made progress for the farmer in his grain drying.

The type dehydrator for any job must be designed and planned for the job to be done, considering the rate of tons of finished product per hour, and the cost of the unit planned.

Keep in mind these factors regarding the various dehydrators:

1. The type dehydrator to use depends on the hardness or density of the product; for example, alfalfa, grass hay, grain sorghum, rice, etc.

2. Breaking down cell structure in the process of dehydration by bruising, mashing, etc.: for example, peaches, apricots, grapes, figs, etc.

3. Amount of product processed per hour.

4. Location of plant or accessibility to utilities, fields, etc.

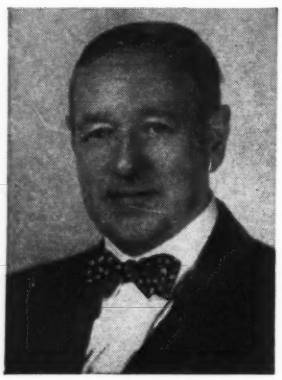
Digests of papers presented at first annual Short Course in Gas Technology, Texas College of Arts and Industries, August, 1946.

PROMOTIONAL NOTES AND NOTIONS

By STANLEY JENKS

Dealer Group Insurance

THERE has been plenty said elsewhere about the Consolidated Edison Co., New York, plan for the standard financing of appliance installment sales in the territory it serves, with a carrying charge to the purchaser averaging $4.88 per $100 annually. The objective, of course, is to allow any authorized dealer, no matter how small he is, to compete on equal terms with his bigger competitors.



An important innovation, and the first to my knowledge in American utility circles, is a group life insurance plan also made available to authorized dealers and their employees. When he announced the plan, E. F. Jeffe, vice president, pointed out that the usual minimum requirement for a group insurance policy is 50 employees. Consolidated Edison's authorized dealers average three employees. Normally barred from the benefits of low-cost group insurance, they now can enjoy it *because they are cooperating authorized dealers of the utility*.

It is easy to realize what this means to the dealer himself in stabilizing his own sales organization.

The more you study sales promotion, the more you appreciate the "all-importance" of the welfare of personnel on the firing line.

As Others See Us

ONE of the more noticeable aftermaths of war is the breakdown in common courtesy in our daily contacts with others. The wartime labor shortage, the upgrading of inferiors, and the tension of war itself were mostly responsible. Of course, there is with us always the lad who has never been able to distinguish between civility and servility. He obviously has no place in the public utility business in any capacity.

Courteous public service, however, needs more than the inherent politeness of the average intelligent individual. It requires special training, and utility employees should get it, if for no other reason than that it is good business.

Any air traveler these days knows the havoc novices in public service can play in the management's efforts to earn the good will and support of the traveling public. Our public, encouraged by the public ownership gang, are at times inclined to claim we are arbitrary in our ways, because they have to do business with us whether they like it or not. It's a far-fetched attitude, but it unfortunately exists and is fostered every time an employee starts on an "or else" tack.

They tell the story of the colored man who called his mule "Public Service Corporation." Asked why, he explained, "Dat am de nachel name o' a mule like him. Dat mule kin stan' mo' abuse an' go right on habbin' his own way dan any pusson yo' eber see."

Outdoor Meter Index

WHILE not a sales item, the Telegas remote meter index for installation on the outside of a home is a first-rate selling weapon for gas service. From the large interest it aroused at the A.G.A. Exhibit in Atlantic City last fall, it was anticipated that more would have been heard about it.

The many advantages of being able to read meters without having to go inside the home are obvious. In my utility days, the way the customers complained, it always seemed that the meter reader in muddy shoes—you'd think he purposely waded through every mud pool on his way—called the very day the customer had either just scrubbed the kitchen floor or painted the basement floor. Which made it tough for the salesman who had the bad luck to canvass her.

Nobody benefits more than the appliance salesman—unless it is the customer—when everything possible is being done to make it as easy as possible for the customer to do business with the utility.

Clothes Drying

GAS service is measured by its usefulness to the customer. The broader its usefulness, the more impregnable its position becomes in American life. Wallace M. Chamberlain, chairman, Residential Gas Section, A.G.A., has emphasized this factor in listing the new gas steam oven, incinerator, and clothes dryer as part of the gas industry's promotional program.

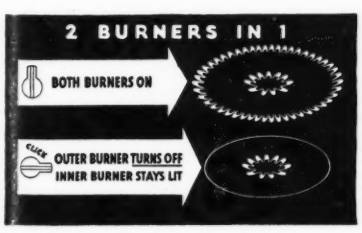
The gas clothes dryer is not a new idea. In fact, it has a much worked over record in gas appliance promotion, dating back at least 24 years to my knowledge. In the past, for some reason or other, we found it a real promotional problem. It is still a mystery to me why it didn't sell like hotcakes. It has everything—speed, convenience, and reliability. But, selling it in those days was something else again. Women, easily the more reactionary sex, felt that outdoors, where it could flap on a clothesline, was the only place to dry laundry "sweet." The sun, they claimed, had a mystical quality that had no substitute. It was with most of them more than an old wives' tale; it was a religious conviction, as though it were a relic of our sun-worshipping ancestors. Let us hope domestic science classes in schools and colleges in the interim have uprooted this fallacy, because the clothes dryer load is desirable business, and there is no logical reason why we shouldn't have it if we go after it.

Better Homes and Gardens
The American Home
Companion
Journal
McCall's
Before Buying Your NEW RANGE
HARPER CENTER SIMMER BURNERS
Harper Center Simmer Burners are superior to all other top burners because each Harper burner is really 2 burners in 1. As shown in diagram, the big outer burner brings foods to a quick boil. Turn handle until it "clicks" and the big burner goes out, leaving only the small, efficient inner burner lit to finish the cooking.
Only the separate Harper Center Simmer gives you the controlled low heats you need to keep foods warm for serving . . . to eliminate pot watching and boiling dry . . . to allow cooking with little water, which saves time and gas and keeps the average kitchen 9 degrees cooler. Only the Harper separate Center Simmer can help you so much in your cooking.
Insist on Harper Burners! *18 Leading Gas Ranges are Harper Equipped
2 BURNERS IN 1
BOTH BURNERS ON
CLICK OUTER BURNER TURNS OFF INNER BURNER STAYS LIT
HARPER-WYMAN COMPANY, CHICAGO 20
Range buyers read about the new, improved
HARPER CENTER SIMMER BURNER
in these powerful selling magazines

"Word-of-mouth" advertising in the past sold more than a million and a half gas ranges equipped with the Harper Center Simmer Burner. And now, for the first time, we are telling your customers about this famous top burner, using the leading national magazines shown here. It means that some 21,500,000 women readers will know how to identify Harper equipped ranges.

It's easy to trade-up your customers to a higher priced range by *demonstrating* the many advantages of the Harper Center Simmer Burner... the "2 burners in 1" top burner that gives just the right heat for every cooking requirement. The measured heat of the Cooking Burner eliminates "pot-watching"... keeps kitchens cooler... requires so little water that vital minerals and vitamins are always retained, making foods tastier, more nutritious.

To help you sell more, and *better* ranges, we have prepared a FREE booklet, "How to Sell More Gas Ranges," which contains a series of quick, convincing floor demonstrations planned to dramatize the advantages of the modern gas range. Send for copies for your salesmen. Harper-Wyman Company, 8565 Vincennes Avenue, Chicago 20, Ill.



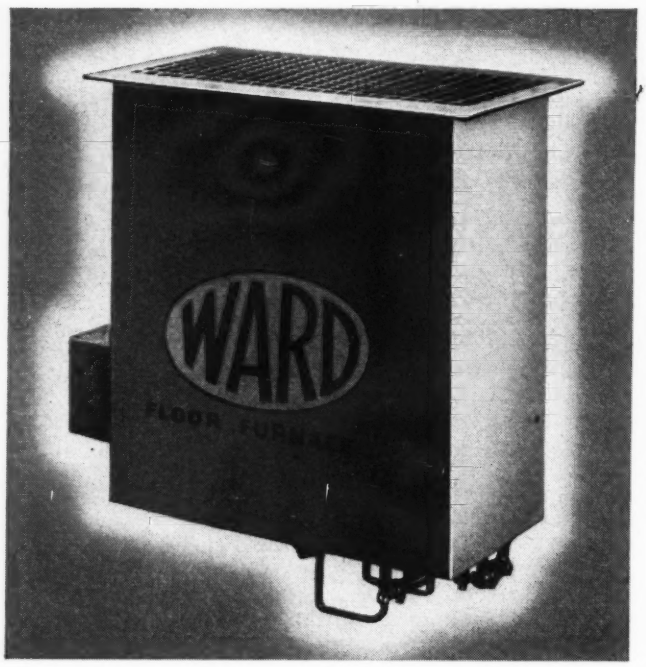
The Harper Center Simmer Burner operates on the unique principle of "2 burners in 1"... a STARTING BURNER for frying and to start foods boiling, plus a small, economical COOKING BURNER, to maintain the cooking... both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner made.

HARPER CENTER SIMMER

"... Holds the Lines for Gas"

HARPER CENTER SIMMER BURNER

NEW APPLIANCE
SALES POINTERS



The Ward furnace is a "complete package," entirely self-contained. All controls and accessors are built-in.

Ward Floor Furnace

With "Bilt-in Thermo-Control"

Manufacturer: Ward Heater Co., 1800 West Washington Blvd., Los Angeles 7, Calif.

The Ward floor furnace now features an entirely new Ward "Bilt-in Thermo Control." This new feature and the automatic pilot are the result of work started in 1941 to improve the Ward floor furnace. Is *completely built-in*, and is the result of extensive experiments which, the company states, have proved that a thermostat will operate more effectively at floor level than at a higher point; in this location, the control anticipates room temperature changes and regulates the flow of heat to preserve a steady, healthful degree of warmth.

The Ward Bilt-in Thermo Control contacts practically all the air in the room as it passes through the furnace, from three to six times per hour. The installation of the 1947 Ward Bilt-in Thermo Control Furnace is as simple as that of the manually controlled furnace. The gas valve, pilot generator, electric wires, and generator cable are all self-contained within the furnace; insulated, connected, and protected; no adjustments, connections, or alterations are required by the installer. Gas and vent are connected in the usual manner, and the thermo-controlled furnace is ready to go to work.

This control obeys the slightest wish with regard to temperature of the home; it automatically turns the furnace off and on to keep the warmth of the room as desired; its action is accurate and timely.

The automatic safety pilot on the natural gas furnace cuts off the gas supply to the main burner in event of pilot failure, and on liquefied petroleum gas furnaces, all gas is shut off to both pilot and burner in the event of pilot failure.

Operation of this new Ward Bilt-in Thermo Control is from a dial, located at the register, which may be easily set for any desired degree of warmth.

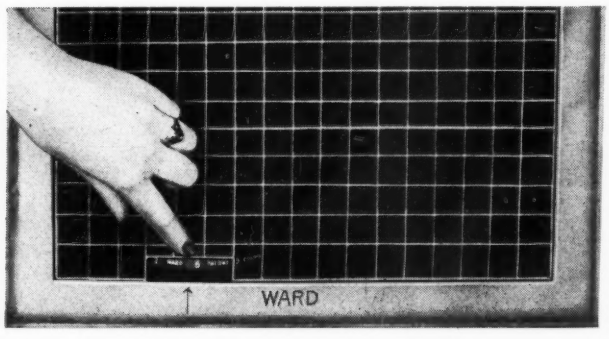
The Ward furnace is a sturdy, "complete package," entirely self-contained with all controls and accessories built-in. It can be simply and quickly installed without muss or dirt —ready to go to work the same day. Sixty-four models are serving wherever natural, manufactured, or liquefied petroleum gases are available.

The Ward furnace provides trouble-free operation, economy in fuel consumption and complete heating comfort. Room air is kept fresh, clean, and healthful, with no unpleasant odors or stuffy closeness. Natural humidity is preserved—there are no sweaty walls or foggy windows. The Ward scientific principle of air circulation eliminates all possibility of chilly corners or frigid floors. A 10-year guarantee goes with each Ward floor furnace sold.

Ward's engineers can rightfully claim the advantage of many years of research, as the company pioneered the floor furnace in 1909. This fact is an important point for salesmen to stress in marketing this appliance.

Other feaures of the Ward floor furnace:

1. *Self-Sealing Lighter Door.* Hermetically sealed by expansion of brass screw cap. No chance of combustion gases escaping into room.
2. *Cast Iron Fire Box (Flame Fender).* Practically impossible to burn unit out around intense heat zone. Many years' longer life with this important construction feature.
3. *Vent Tube Insulator. Four* sides circulation by keeping heat from vent tube out of cold air return.
4. *Asbestos Insulated Inner Shell.* Constant circulation regardless of hours furnace burns. Heat transference from heat chamber through inner-shell cut to absolute minimum, allowing constant re-circulation of air from floor.



Dial, located at the register, controls operation of the "Bilt-in Thermo Control."

Jewels of Cooking Performance

- "INSTA-MATIC" CLOCK CONTROL
- EXTRA-CAPACITY "GLO" BROILER
- HANDY SNACK BROILER
- SPECIAL COFFEE BURNER
- TOASTING COMPARTMENT
- NOVEL CRISPING BIN
- ALUMINUM GRIDDLE

ROPER'S "THOUSAND DOLLAR BEAUTY"

pre-viewed at the A. G. A. convention in Atlantic City

Truly the toast of the industry, the glamorous new extra-capacity, ROPER "Town and Country" now "Automatically Yours" . . . it's in production. Sell it with pride. Order as 47-9310.

BUILT TO GP STANDARDS — GEO. D. ROPER CORPORATION • ROCKFORD, ILLINOIS

NEW PRODUCTS

Electrolysis Controller

Cook Research Laboratories, Chicago, Ill.
Model: Stray Current Control System.
Application: Designed to prevent the damaging effects caused by electrolytic action on underground pipe installations.
Description: The system is a current and voltage-sensitive device, operating jointly on a high current contactor. The contactor is activated by the current and voltage-sensitive device, the functioning of which depends on the amount of current or potential present in the pipe. This means when stray current tends to leave the pipe, the contactor will close, thereby connecting the pipe and rail with a solid metallic bond on which the current may travel harmlessly rather than by damaging electrolytic action through the soil.

Conversely, the contactor will open instantaneously when the current tends to flow in the opposite direction; that is, from rail to pipe. In this manner the contactor will prevent the system from becoming a back-path for more stray

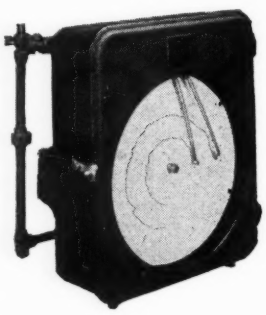
current which, if permitted to flow uncontrolled, would result in further electrolysis of the pipe.

The unit is 26 in. high, 8 in. wide and weighs about 40 lbs. In the field, the system will be attached to telephone poles, bridges or any facility near the points at which the deplating of pipes due to electrolysis is occurring.

Mercuryless Meter

American Recording Chart Co., 3113 E. 11th St., Los Angeles 23, Calif.
Model: Arcco Meter
Application: Measures gases and liquids under high or low line pressures. No mercury or other liquid column is employed, and there are no pivots, bearings or stuffing boxes to allow leakage.
Description: This meter is of the orifice type with differential pressure acting upon a strong, tough and highly resilient spring phosphor-bronze bellows. Under this influence the bellows is distended, its distension being opposed by the elastic resistance of a "torsion tube" which transmits motion to the recording mechanism outside the pressure chamber without the necessity of any opening through the meter walls.

Low weight facilitates portability. The manufacturer claims that the meter is very accurate and responsive,



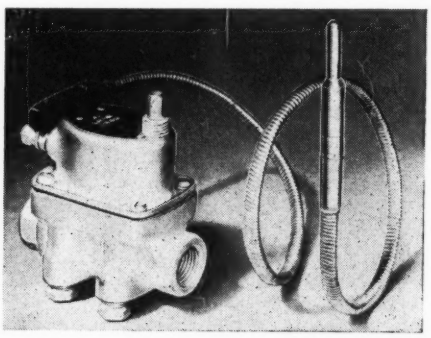
yet rugged in design so even the roughest handling has no effect on its calibration. It is said to be ideal for quick checking in the field upon the accuracy of other meters or for continuous recording. Send to the manufacturer for bulletin 102A.

Pilot Control Valve

General Controls Co., 801 Allen Ave., Glendale, Calif.
Model: MR-2 Thermovalve.
Application: Designed to provide automatic safety pilot control of the fuel to the main burner of a gas-fired appliance.
Description: A thermocouple placed in the pilot flame generates the current required to hold the valve in the open position. Failure of the pilot flame stops the generation of current, closing the valve. The MR-2 valve is of the manual reset type in that once the valve has closed, it must be manually opened. A position indicator flag is located beneath a glass window on the valve cover near the reset button. This indicator gives a visual check as to whether the valve seat is open or closed. Pilot gas take-offs are provided both ahead and after the main valve seat, allowing 100% shut-off, or main burner shut-off, as desired.

A single thermocouple enclosed in a stainless steel cover and placed in the pilot flame is heated by the flame and produces a small electrical current, which energizes the electro-magnet in the thermovalve. The magnet is not capable of actuating the valve to the open position but will hold the armature in contact with it once it has been moved there manually. This is done by pressing the reset button. The armature and main valve seat are connected to the valve rocker in such a way that pressing the reset button brings the armature in contact with the magnet poles and also opens the valve seat, allowing gas to flow through the valves.

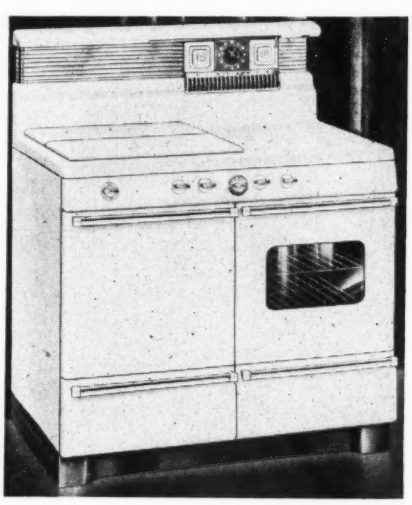
Thus, as long as the pilot burner remains lighted and heat is applied to the thermocouple, the valve will remain in the open position. Should the pilot light become extinguished and



the thermocouple be allowed to cool, the electrical current would cease. With no current flowing through the magnet coil the armature would be released, allowing spring to close the main valve, shutting off the flow of gas to the main burner. Since the valve is closed by spring force it will operate in any position.

"Broilercue" Range

Florence Stove Co., 205 School St., Gardner, Mass.
Model: Registered Gas Range.
Description: This new range went on display at the January markets. It features a new waist-high "Broilercue," which makes it actually a two-oven range. Large cuts of meat can be roasted, broiled or barbecued in the Broilercue while hot breads, casseroles or cakes are baking in the oven. The deluxe ranges are equipped with sight window and interior oven light. The one-piece turret top saves space, and the burners have "Hi-Lo" controls with a fixed summering flame. A porcelained



pan and aluminum grille, adjustable to three positions, is mounted on the Broilercue door. Door, pan and grille swing out away from the heat so that meat and other food may be seen and turned with ease and comfort.

"Detroit" V-570 GAS VALVE

EXCLUSIVE STEP OPENING ASSURES FAR BETTER BURNER OPERATION

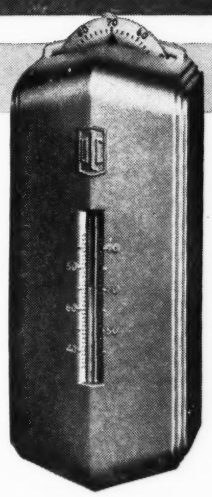
The "Detroit" V-570 Gas Valve has the exclusive step opening feature which assures better, quieter burner operation. When the thermostat calls for heat, the valve opens partially by snap action. After about 10 seconds to warm the stack and establish draft, the valve opens gradually to full gas flow. Noise and surging are eliminated. This step opening is an exclusive "Detroit" feature.

No click or hum—operation of valve is quiet. Closing is positive—valve closes to step position, then snaps off.

Operated by low voltage heat motor—installation and wiring are easy. Simple, sturdy design—easily opened for cleaning without breaking pipe connections.

Sizes ½" to 1¼"—Write for bulletin No. 201.

ACCURATELY COMPENSATED TEMPERATURE CONTROL



"DETROIT" NO. 411 CH THERMOSTAT

Heat compensation feature eliminates costly overheating—minimizes "cold 70". Heating cycle easily varied for condition of each installation by means of patented adjustable compensating heater. Also available without heat compensation. An exceptionally sensitive, durable thermostat.

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Synthesis Gas Produced in Alabama Underground Coal Gasification Test

By MILTON H. FIES

Manager of Coal Operations, Alabama Power Co.

PROGRESS of the gasification experiment at Gorgas Mine, Ala., being conducted by the U. S. Bureau of Mines and the Alabama Power Co., Birmingham, has been very satisfactory.

The following salient developments have been noted during the first 16 days of operation:

No difficulty has been encountered in maintaining combustion. More than this, there is strong indication that it is possible to shift the position of the flame along the exposed coal in the earth.

The mechanical difficulties which were encountered at the start of the experiment were of a nature as are generally expected under such circumstances. These difficulties are now almost entirely eliminated.

One of the interesting phases of the experiment, and one which was an important factor in the selection of the location, will be the removal of the strata overlying the burned area. While it is our belief that the roof falls have been more or less as had been anticipated, this planned subsequent investigation will make it possible to determine what has transpired in the earth during the burning. This exploration will be conducted with the same minute care that an archaeologist uses to examine prehistoric mounds. Before removing the stratified rocks above the coal, the burned area will be steamed for several days, then flooded with water. After the water drains from the area an effort will be made to enter the unburned portion, following which the overlying strata will be removed with bulldozers and power shovels.

During the operation thus far, the resistance resulting from the roof falls and other causes, yet to be determined, has prevented sufficient air flow to intensify the burning of the coal to produce the highest possible quality gas.

Accordingly, oxygen was used to enrich the air. Because of technical restrictions only a limited amount of oxygen per minute was mixed with the air. Despite the fact that we were never able to raise the temperature to the desired degree, it was nevertheless demonstrated that synthesis gas can be made continuously. By synthesis gas is meant a gas which can be converted to gasoline, diesel oil, and the like.

After we had exhausted the available supply of oxygen it was noted that operating conditions and gas quality showed a steady improvement.

The experiment has also proven that by blowing gas and steam alternately into the burning mine, synthesis gas can be likewise produced in this manner. As a matter of fact, during the first few days of the experiment gas of approximately 250 Btu was made continuously for two hours.

It should be emphasized that the foregoing observations are based only on the first 16 days of operation of which, during the initial stages, considerable time was consumed in making adjustments of equipment and apparatus.

Further, extensive research on the many problems of underground gasification is essential to determine definitely its technical and economic feasibility.

San Diego to Build 10 MMcf Holder

PLANS for the erection of a 10 MMcf natural gas holder in San Diego this year have been revealed by L. M. Klauber, president of the San Diego Gas & Electric Co., in an announcement of a $19.4 million two-year construction program.

The holder, which will be as large as any on the Pacific Coast, will stand 220 ft. high and will be 276 ft. in diameter. It is estimated that 7.5 million lb. of steel will be used in its construction. Klauber revealed that his company was studying the possibility of installing an elevator to facilitate a weekly inspection of the holder's plates, seams, roller bearings, etc.

The holder's 10 MMcf capacity will be greater than the combined capacity of all of the present holders in the city. The largest holder in the company's system at present is a 6 MMcf holder. Addition of the new holder will bring the company's total storage capacity within the city of San Diego to 19 MMcf.

The new holder will be filled during off-peak hours, and the gas will be withdrawn to equate the heavy drain on the gas supply line from the north during the peak periods. A mile-long, 36-in. pipe line will connect the holder to the company's plant. Construction is scheduled to start in the near future, and it is expected that the holder will be completed and in operation by early 1948.

The $19,400,000 budget is the largest ever announced by the utility and is necessitated by the continued increase in demands for both gas and electric service throughout the San Diego territory, Klauber stated. The company has gained nearly 14,000 gas and electric customers since V-J Day. Included in the budget is $5.5 million for the completion of a new 50,000 kw generating unit being installed now at the company's Silver Gate plant; $2.9 million for a new 66,000-volt transmission network and substations to provide for the great growth in demand for service in the San Diego county suburban and rural areas; and nearly $10 million for the extension of service to new gas and electric customers, the installation of equipment to reinforce the existing distribution system and various buildings and improvements.

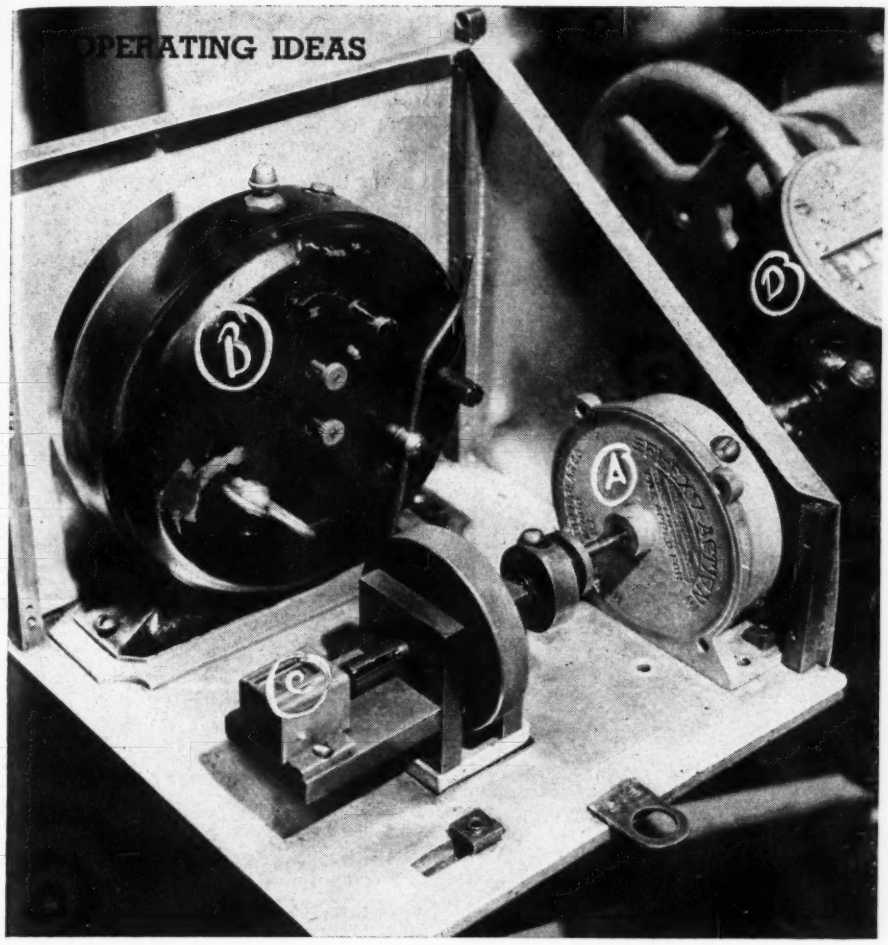
FPC Accepts Revised Rates of 3 Companies

THE Federal Power Commission late in January accepted the revised rate schedules filed by United Fuel Gas Co., Cincinnati Gas Transportation Co. and Warfield Gas Co., which will effect a reduction of approximately $1,753,000 annually to customer companies purchasing natural gas in interstate commerce. The reduction was based on 1945 revenues.

Companies affected and the approximate reductions are as follows:

CUSTOMERS OF UNITED	
Central Kentucky Natural Gas Co.	$ 62,206.55
Manufacturers Light & Heat Co. and Home Gas Co.	631,240.99
The Ohio Fuel Gas Co.	452,782.18
Portsmouth Gas Co.	98,642.64
Point Pleasant Natural Gas Co.	1,864.34
CUSTOMERS OF CINCINNATI	
Bracken County Gas Co.	454.09
Cincinnati Gas & Electric Co.	351,506.60
Kentucky Utilities Co.	10,068.04
Union Light, Heat & Power Co.	144,145.12

Warfield's rate schedule did not proposes a change of rates, but included other conditions which are part of the schedules filed by United and Cincinnati Gas Transportation. These conditions include a standard service agreement, a new term provision, specific agreements as to volumes of gas delivered, a guarantee of the heat content of the gas, and a uniform measurement base.



Noon-day reading assembly for industrial Connersville meters used by Public Service Co. of Northern Illinois. (A) Merkle-Kroff reduction gear, (B) special alarm clock, (C) counter, (D) counter on Connersville meter.

New Gear Improves Meter Counter

SUGGESTED BY John Kelderhouse, Western Gas Operating department, Public Service Co. of Northern Illinois. Mr. Kelderhouse was awarded $100 by his company for his idea, which concerns a new use of Merkle-Kroff reduction gear and a new method of installing it in the noon-day reading assembly of industrial Connersville meters.

This particular type of noon-day reading assembly was designed and built by the utility about 10 years ago for all installations where Connersville meters had to be read at noon according to contract obligations. Obviating the necessity of sending men to various locations where these noon readings were necessary, the home-made reading assembly made possible an automatic noon reading.

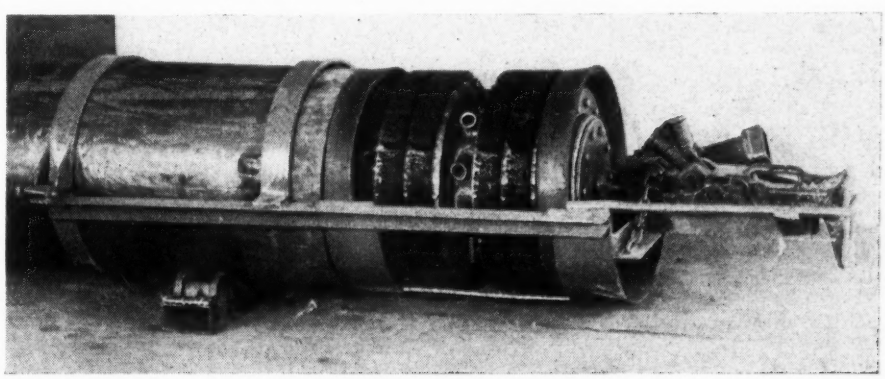
A special alarm clock, connected to the noon-day counters, operated from the shaft through suitable reduction gears, was set so that the alarm mechanism automatically tripped out the counter every noon. Later in the day, a reader visited each installation, took the reading, and reset this counter to correspond with that on the Connersville meter.

The gear reduction equipment was a custombuilt six-piece brass box (2½ x 2 x 1¼ in.) fitted with two sets of hand machined 10-1 reduction worm gears, four sets of ball bearings for the horizontal shafts, and a stamped brass connector bushing. The six parts of the gear box were fitted and soldered together to make them oil-tight. Each installation was assembled as a unit and the parts were not readily interchangeable.

While this equipment served the purpose for a while, it was found that through constant use the parts showed wear and the maintenance cost increased appreciably with the length of service.

The new reduction gear (a self-scaled 100-1 reduction gear unit) makes it possible to make repairs in the event of a failure in the noon-day counter on Connersville type meters without shutting down the meter and operating through the bypass. Previously, as these shutdowns occurred, it was necessary to have a minimum of three people witness the flow through the bypass for the purpose of estimating the customer's meter during the period of the shutdown.

With the use of the new reduction gear, Mr. Kelderhouse was able to redesign the take-off from the Connersville meters, eliminating the speedometer cable drive. It also allows the drive from the meter to be made from either the counter shaft end of the meter or the opposite meter impellor shaft with no change needed in the 100-1 reduction unit. This was impossible under the old arrangement because the cable connector was an integral part of the gear box and was used as a stuffing gland. To convert this to a direct drive it would have been necessary to rebuild the gear box —a machine shop job.



Go-devil in place in inserter.

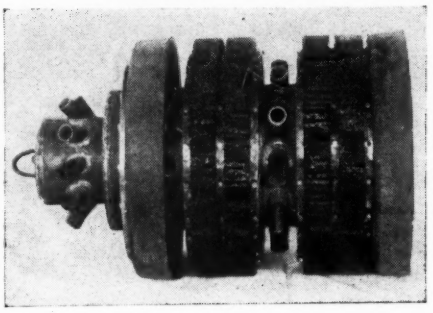
Go-Devil for Cleaning Pipe Lines

SUBMITTED BY D. K. Stephens, superintendent, transmission pipe lines, Panhandle Eastern Pipe Line Co.

A go-devil or "pig" designed and patented by Mr. Stephens, played an important role in the internal cleaning last summer of 566 miles of Panhandle Eastern's pipe lines. Efficiency tests made before and after the cleaning operations indicated that the capacity

of the lines increased approximately 10 MMcf after cleaning. The average time lost when a line was out of service was four hours and 40 minutes. From data collected since the completion of the program, it is estimated that the efficiency of the cleaned portion of each loop has increased from 2.1% to 13%, averaging 6%.

The go-devil, which is manufactured by T. D. Williamson, Inc., of Tulsa, has a speed of approximately 60 mph. Gas pressure or other fluid pressure is used to propel it through the pipe line. Nozzles on the end are set at an angle



so that a certain amount of gas passes through the machine, causing it to turn in the pipe as it travels along. This turning feature insures even wear on the brushes and rubber squeegees.

The device is placed in the line on the downstream side of a gate valve and taken out just upstream from the next gate valve. This is generally a run of eight to 10 miles, depending on the distance between valves. The joint where the go-devil emerges is lifted up at one end so that the go-devil and subsequent blow with gas come out above the ground level.

Mr. Stephens is working on an improved go-devil which he hopes to try out by late spring.

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Bottled Gas Systems
Gas Utility Service from Central Plants
Utility Service from a Central Plant
Appliance Installation and Servicing
Domestic Applications
Commercial Applications
Industrial Applications
Enrichment, Peak Load, and Standby Uses
Fuel for Internal Combustion Engines
N.B.F.U. Pamphlet No. 58
I.C.C. Motor Carrier Safety Regulations
Loading and Unloading from Railroad Tank Cars
Marine Regulations
Safety Orders, State of California
Products Liability Insurance
Sealer of Weights and Measures
Handy Tables for Field Use
Bibliography
Glossary of Terms
Comparison With Other Fuels

GAS *We pay postage on orders accompanied by check or money order. In California add 2½% for sales tax.*

1709 WEST EIGHTH STREET LOS ANGELES 14, CALIFORNIA

Oklahoma Leads States in Extending Oil Compact

Oklahoma, through signature by Governor Roy J. Turner on Feb. 1, was the first state to extend the interstate compact to conserve oil and gas.

The executive committee of the Interstate Oil Compact Commission, at a meeting in Oklahoma City, had previously voted to ask for such an extension in Oklahoma and all other compact member states. There are now 17 state members of the commission.

The compact expires on September 1, 1947, but governors of all compact member states, except four, have the authority to extend. Legislation to continue the agreement in effect is required in Texas, Kansas, Illinois, Michigan.

Gas Display Planned for Western Metal Show

More than 55,000 scientists, engineers and industrial executives are expected to attend the fifth Western Metal Congress and Exposition, to be held in Oakland (Calif.) Municipal Auditorium and Exposition Building, for six days beginning March 22, according to William H. Eisenman, managing director of the exposition and national secretary of the American Society for Metals.

More than 200 exhibitors are listed, including Bryant Heater Co., Natural Gas Equipment Co., Pacific Coast Gas Association, Pacific Gas & Electric Co. and Union Carbide & Carbon Co. In the block of space taken by the PCGA will be represented a number of western manufacturers of industrial gas-consuming equipment.

Over 75 technical papers, lecture courses and round-table discussions have been arranged. One of the papers to be presented which will be of particular interest to the gas industry is "Controlled Atmospheres" by H. M. Heyn, manager of the heat treat division of Surface Combustion Corp., Toledo.

Operating 'round the clock, day and night, the Perfex Tireless Twins are silent dependable servants that maintain temperature, regulate flames and safeguard heating plants . . . taking complete charge of the heating job.

The *tireless twins* make Automatic Heating *effortless*

Automatic heating is the only modern home equipment that provides complete freedom from physical effort . . . automatic dish washers require sorting and stacking . . . vacuum cleaners, pushing and pulling, etc. With the Tireless Twins, you can sell automatic heating to your prospects as the only modern home equipment that is *completely, effortlessly automatic.*

Twin Contact Controls are the nerve center of all better heating systems. Their superior quality is an important reason why leading manufacturers of automatic heating carefully pre-select Twin Contact Controls to bear their trade mark names.

PERFEX

TWIN CONTACT CONTROLS

UFACTURERS OF AUTOMATIC CONTROLS BEARING THE TRADE MARK NAMES
EADING PRODUCERS OF AUTOMATIC HEATING SYSTEMS AND APPLIANCES

PERFEX CORPORATION, MILWAUKEE 7, WIS., Perfex Controls Ltd. Toronto 1, Ont.

FFORTLESS AUTOMATIC HEAT DOES THE JOB COMPLETE

PEOPLE

• **Frederick W. Crone,** director of the editorial department of Consolidated Edison Co. of New York, Inc., retired on Jan. 31, in accordance with the company's retirement age rule. **Howard F. Weeks,** who has been assistant director of the department, has been selected to succeed him, according to **Clarence L. Law,** vice president in charge of public relations. Crone joined the New York Edison Co. in 1928 as assistant to the president. In 1933 he became director of the editorial department.

• The Geo. D. Roper Corp. has announced the appointment of **R. R. Chapman** as assistant division manager with headquarters in the Chicago office. He will work with **J. K. Busch,** Midwestern division manager. Chapman was personnel manager of Peoples Gas, Light & Coke Co., Chicago, for 12 years prior to joining Roper in 1940.

Willis Ferguson is the new manager of the Chicago office, it was also announced.

• Appointment of **Edward M. Brody** as district manager for the Indiana-Kentucky - Tennessee - Mississippi area has been announced by **M. A. Naulin,** sales manager of the Incineration Division of Bowser, Inc., Milwaukee, Wis. Other newly appointed district managers are **H. W. Dodge,** New England and Eastern States; **George H. Hand,** Ohio-Michigan and western Pennsylvania; and **J. T. Prout,** Middle-West.

• **Wendell C. Davis** has been elected vice president of Cribben & Sexton Co., Chicago. Davis joined the company as controller in 1942, was elected treasurer in January, 1943, and became a member of the board of directors in 1946. During the war, Davis had charge of all war contracts and negotiations with the War Contract Price Adjustment board. He will continue his present duties as treasurer and controller of the company.

• **James P. Wiseman,** general sales manager of The Fluor Corp., Ltd., has been appointed to the board of directors effective Jan. 1, 1947. Wiseman, who has been with the company four years, was placed in charge of the sales division last September.

• The promotion of **Horace Sanders** to assistant Southwestern district manager for The Cooper-Bessemer Corp., effective Jan. 1, was recently announced by **Stanley E. Johnson,** vice president and director of sales. Sanders has been associated with the firm for nearly 20 years, with headquarters in Dallas since 1931.

• **George S. Campbell** retired from his position as Pasadena district manager of the Southern California Gas Co. on Feb. 1 after 43 years of service. **Myron G. Thomas,** assistant district manager, succeeds him. Campbell started working for the gas company as soon as he finished school. He is well known in the Pasadena area because of his extremely active civic life.

G. S. Campbell

M. G. Thomas

• General Controls Co., Glendale, Calif., has appointed **E. B. Maire** regional sales manager of its Midwestern, Southern and Eastern branch office territories, including Boston, New York, Philadelphia, Pittsburgh, Detroit, Cleveland, Atlanta and Chicago. Maire will coordinate the efforts of the above factory branch offices with the factory.

• **Lynn H. Johnson** has been appointed sales manager of the gas controls division of Minneapolis-Honeywell Regulator Co., according to **A. H. Lockrae,** vice president. Joining the company in 1933 as a member of the production department, Johnson later was transferred to the sales department. He attained the rank of captain in the army, rejoined Honeywell after the war, and was assigned to the Cleveland office as assistant to the regional manager.

• **F. T. Fahlen, Jr.,** has been elected vice president in charge of division operations for Central Arizona Light and Power Co., Phoenix, which recently divided its expanded territory into four divisions. Fahlen, former assistant vice president, has complete charge of operations in the Phoenix area, and also has supervision of the divisions which were formed to serve the needs of the company's growing service area. Except for two years of service in the South Pacific, where he attained the rank of lieutenant (j.g.) in the U. S. Naval Reserve, Fahlen has been associated with the utility for more than 13 years.

• **Dr. William Parks Yant,** director of research, Mine Safety Appliances Co., Pittsburgh, was chosen the 1946 recipient of the Pittsburgh Award, bestowed annually by the Pittsburgh section of the American Chemical Society for outstanding service to chemistry. In making the presentation, Dean Herbert E. Longenecker, chairman of the section, said: "Dr. Yant has contributed prolifically to science, industry and welfare by improving health, reducing suffering, and raising the general economic level."

• **Thomas C. Hall** recently became a representative of Geo. D. Roper Corp. in the Pacific Coast division. He will work with his father, **Tom H. Hall,** division manager. Tom graduated from the University of Southern California in 1943, skippered a PT boat in the navy for two years, and then served in the appliance field. He worked several summers at the Roper plant in Rockford, Ill., while attending college.

• **W. F. Rockwell, Jr.,** vice president and general manager, Rockwell Manufacturing Co., Pittsburgh, has announced three appointments to the company's executive staff. **C. A. Wiken,** who has been chief engineer of the Delta Manufacturing division in Milwaukee for eight years, is now vice president in charge of engineering. **J. E. Ashman** has been named controller for the firm, after four years with U. S. Steel as director of procedure for Carnegie-Illinois Steel Corp., and 13 years as National Enterprises representative for the Burroughs Adding Machine Co. **A. E. McIntyre,** who has been manager of the Nordstrom Valve division plant in Oakland, Calif., has been transferred to Pittsburgh as general manager of the Pittsburgh Equitable Meter division. He will continue as manager of the Nordstrom Valve division. All three men will make their headquarters at the Pittsburgh general offices.

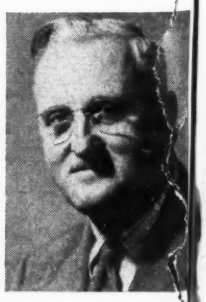
W. C. Davis
. . . Cribben V. P.

J. P. Wiseman
. . . with Fluor

L. H. Johnson
. . . Honeywell

A. E. McIntyre

J. E. Ashman



C. A. Wiken

. . . new Rockwell Manufacturing Co. executives

• Servel, Inc., Evansville, Ind., has made several changes in its regional personnel, effective March 1, according to an announcement by **George S. Jones, Jr.**, vice president in charge of sales.

C. A. Miller, who has been Servel west coast regional manager for 11 years, headquartering in San Francisco, has resigned to become a Servel distributor in Los Angeles. Operating as Gas Appliances, Inc., he will take over the distribution of the Servel refrigerator, water heater and kitchen accessories. Miller has been with Servel since its earliest days, serving in various capacities in the service and sales division.

Seward Abbott, now Servel regional manager in Dallas, Texas, has been appointed to succeed Miller as west coast manager. He has been associated with Servel since 1926.

W. K. Grube, present regional manager in Evansville, will go to Dallas to replace Abbott and **O. F. Keune,** currently district manager, with headquarters in Atlanta, has been appointed to succeed Grube.

• **W. A. Friedrich,** director of sales, home appliance division, Hamilton Manufacturing Co., Two Rivers, Wis., has announced the appointment of two new sales representatives for the Hamilton automatic clothes dryer. They are **Ralph L. Ferguson,** Middlewest representative, and **Morgan J. Busch,** whose territory will be the Middle Atlantic and New England states, with headquarters in Harrisburg, Pa. Ferguson was purchasing agent and director of priorities for

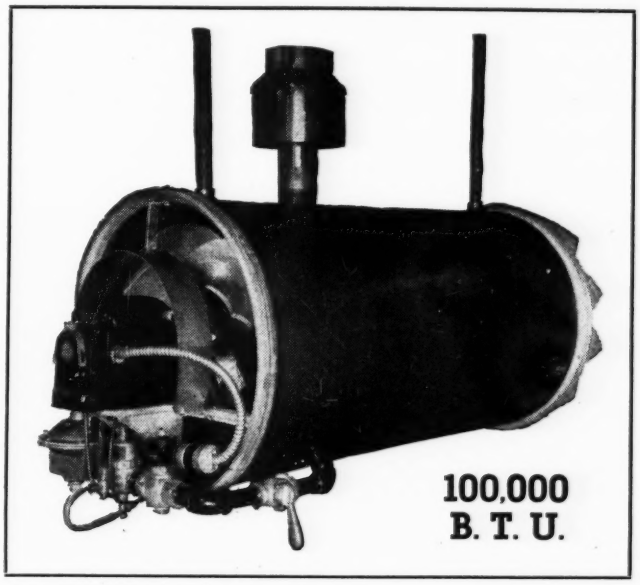
R. L. Ferguson M. J. Busch

Deepfreeze division of Motor Products Corp., North Chicago, from 1942-45. Busch joined Hamilton's cost department in 1939. Following service in the navy during the war, he rejoined the company and went through a complete production training course on the Hamilton dryer.

• **Harry S. Leech,** member of the headquarters sales staff of Ruud Manufacturing Co., Pittsburgh, Pa., has been named zone manager of the new branch office in Cincinnati, according to an announcement by **Frank A. McFerran,** general sales manager. The zone includes southern Ohio and central and eastern Kentucky. Leech recently returned from service with the occupational forces in Tokyo. For 10 years before the war he was associated with Ruud at Pittsburgh in the sales and engineering departments.

• **Russell B. Weston,** assistant advertising manager, Ethyl Corp., has been promoted to the post of advertising manager. Weston joined the firm 20 years ago as a field representative in the New York division.

JOHN ZINK'S



New UNIT HEATER

This new and unique design in suspended space heaters features: More Head Room - Compact Design - More Heat from gas burned, gas company test shows overall efficiency of 82%.

Where floor space is at a premium this turbine type unit has greater heating capacity. Controls are built-in. Unit is shipped completely assembled ready for installation.

One unit will heat a 40' x 80' space. It is A.G.A. approved for liquefied petroleum gases, manufactured or natural gas.

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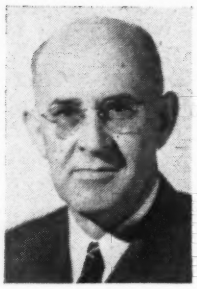
H. J. Gabel



L. H. Verschoor

W. Chamberlain

W. Kurdelski

J. E. Spindle

H. S. Parker

. . . Michigan Consolidated Gas Co. district officials promoted

• A number of personnel changes have occurred in various districts of Michigan Consolidated Gas Co., Detroit, Mich. **Dean W. Flowers,** general manager, Muskegon district, has announced the promotion of **Harry S. Parker** to assistant general manager, **Dan A. Nielsen** to general superintendent, and **Joseph H. Buck** to assistant superintendent.

In the Grand Rapids district, **Glenn R. Chamberlain,** first vice president, stated that **Wallace M. Chamberlain** is now general manager of the district and general sales manager of the western districts. **Albert G. Schroeder,** first assistant secretary, becomes assistant general manager. **Albert F. Mullins,** assistant treasurer of the company, now is also general accounting officer of the western districts. **Walter H. Kurdelski** has been promoted to residential sales manager of the district, and **Leonard H. Verschoor** becomes industrial sales manager.

The production and pipe line district is under the overall charge of **Glenn R. Chamberlain. James E. Spindle** is the new general manager of this district, and **Harry J. Gabel** becomes general superintendent of it, while retaining his position as manager of the Big Rapids district. **J. B. Thomson,** formerly with the Muskegon district, has been made an engineer for the production and pipe line district and for the Big Rapids district. **Ronald O. Ankarberg** is field superintendent, **Henry Hall** is general foreman of maintenance, and **Wesley Morrison** is general foreman of compressors.

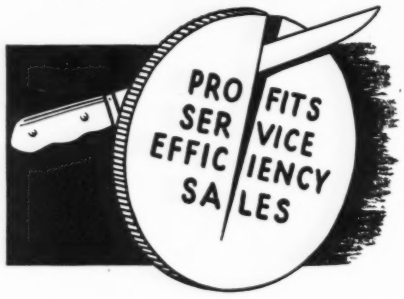
• **D. A. Hulcy,** president of Lone Star Gas Co., Dallas, has announced the appointment of **L. T. Potter** to the newly created position of assistant to the president. Potter has been superintendent of production and assistant general superintendent of the transmission division of the company. He has been with Lone Star more than 18 years.

At the same time, **Elmer F. Schmidt,** vice president in charge of the transmission division, announced the following personnel changes: **Thomas S. Bacon** was promoted from research engineer to chief engineer, **Richard A. Minter** from office engineer to assistant chief engineer, and **Edgar Allen Brown** from chief production engineer to superintendent of production.

• **John J. Daly,** former sales promotion manager, Connecticut Light & Power Co., Waterbury, Conn., has been named retail sales manager to succeed the late **William M. Walsh.** Daly will be assisted by **Charles A. Byron,** who has been with the company's sales department since 1924. Until his promotion, Byron was assistant merchandising manager.

• **J. D. Holbrook,** district manager of the Lone Star Gas Co., has been appointed Sweetwater, Texas, community chairman of the Committee for Economic Development. The announcement was made by **Walter Fuller,** chairman of the CED National Information Committee.

no "CUT-OFF" necessary



IF YOU CONVERT YOUR SMALL CITY GAS PLANT TO

LIQUEFIED PETROLEUM GAS

Liquefied Petroleum Gas Plants operate automatically and assure adequate, dependable, uninterrupted supply of uniform high quality gas regardless of load. Plan now to convert your small city gas plant to Warren's LP-Gas for greater efficiency and profitable operation.

Contact your nearest Warren office today.

"1922 - Silver Anniversary Year - 1947"

WARREN PETROLEUM CORPORATION
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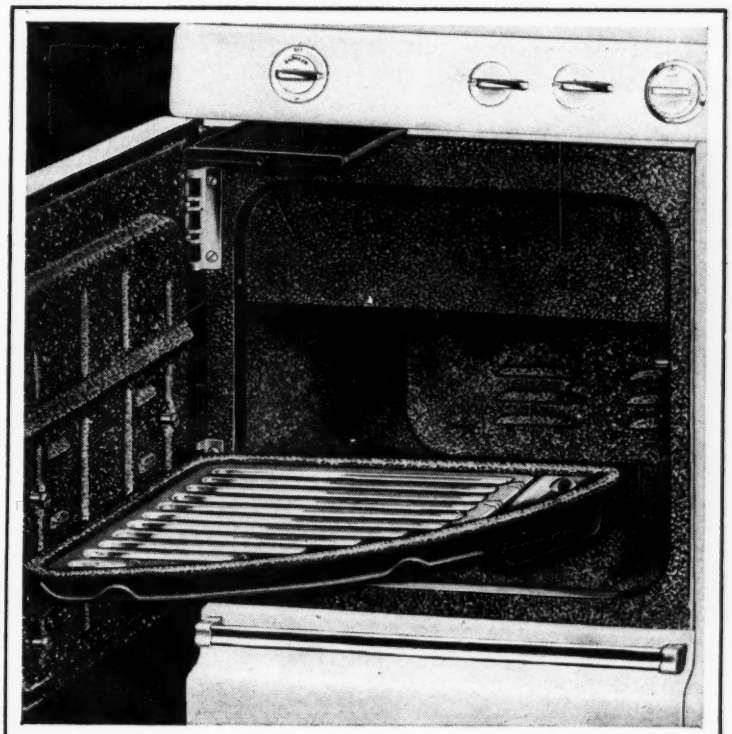
THIS BROILERCUE* FEATURE ALONE SELLS MORE FLORENCE REGISTERED GAS RANGES!

IT's only once in a blue moon that a gas range contains a feature so outstanding that it clinches sales all by itself. But that's the kind of feature the new Swing-Out Florence Broilercue* is!

And that's only part of the story. For the new Florence "Registered" Gas Range is NEW DESIGN all the way through — with one sales-making feature after another! Sell the Florence line — and you sell the gas ranges women want.

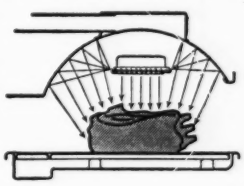
*Patents applied for



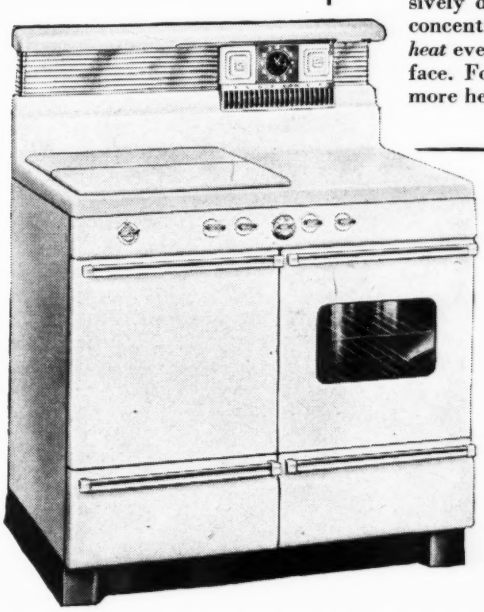
FLORENCE SAYS:
DID YOU EVER SEE A BIGGER LIST OF ALL-STAR FEATURES? THE NEW FLORENCE REGISTERED GAS RANGE SELLS ON SIGHT THROUGH GREATER "SELL-ON-SIGHT" FEATURES!

Only Florence Offers Focused Heat

• As shown in diagram at right, the Florence Broilercue has an exclusively designed arched roof which concentrates penetrating, *radiant heat* evenly over entire broiling surface. Food is made more delicious, more healthful.



- ✓ **Completely New Streamlined Turret-Top Design**
- ✓ **2-Oven Convenience**
- ✓ **Exclusive New Swing-out Broilercue**
- ✓ **Famous Florence Baking Oven**
- ✓ **Easily serviced from the top**
- ✓ **New C-Quik Gas Cock Handles**
- ✓ **New DeLuxe Top Light, Combination Telechron Electric Clock and Time Reminder — Utility Outlet**



Florence

GAS RANGES

FLORENCE STOVE COMPANY... General Sales Offices and Plant: Gardner, Mass. Western Sales Offices and Plant: Kankakee, Ill. Southern Plant: Lewisburg, Tenn. Other Sales Offices: One Park Avenue, N. Y.; 1459 Merchandise Mart, Chicago; 53 Alabama Street, S. W., Atlanta; 301 No. Market Street, Dallas.

THE ANSWER TO YOUR GAS ODORIZING PROBLEMS

Captan *Advantages*

1 Gas-Like Smell
2 Available
3 Volatile
4 Harmless
5 Economical
6 Easy to Handle
7 Uniform
8 Doesn't Fade Out

NATURAL GAS ODORIZING CO., INC.
7620 WALLISVILLE ROAD
HOUSTON, TEXAS

• **L. A. Dixon, Jr.**, and **John Dubois,** as representatives of the Pittsburgh Equitable Meter Division, Rockwell Manufacturing Co., sailed for England early last month on the Queen Elizabeth. They were to negotiate with English manufacturers for the purchase of heavy gauge tin plate for the manufacture of tin gas meters. Dixon and Dubois planned to visit the meter manufacturers in England and on the Continent. Dixon has also been commissioned to make a detailed report on German gas meter methods and designs to the U. S. Department of Commerce. They were scheduled to return to this country on March 15.

• Two new representatives for Bryant Heater Co.'s line of gas-fired heating equipment have been established in Clearwater, Fla., and Jamestown, N. Y. The Bryant-McCoy Co. has been set up at Jamestown by **Philip W. McCoy,** a graduate of Carnegie Institute of Technology, who has been engaged in designing and developing heating equipment since 1927. He was with Bryant and, previously, with Surface Combustion Corp. **Paul J. Schaack,** with Bryant since 1934, established the Bryant-Schaack Co. at Clearwater. He is a graduate of Rose Polytechnic Institute and served during the war as assistant to the director of the plumbing and heating division of WPB.

• **D. R. Berg** has been appointed manager of the heating and combustion sections of the machinery division, Dravo Corp., Pittsburgh. Berg first joined the firm in 1938 and has held several supervisory positions, including assistant general mechanical superintendent and outfit superintendent of Dravo's Neville Island shipyard, and administrative manager of the Wilmington, Del., shipyard.

FOR SALE—One Roots-Connersville Rotary Displacement Meter, size 12 x 36, capacity 96,000 cu. ft. per hr. at ½" differential, 16" openings. Shipping weight app. 4500 lbs. In excellent condition. Priced at $1200. F.O.B. Jacksonville, Fla., by

JACKSONVILLE GAS CORP.
P. O. Box 330 Jacksonville, Florida

ENGINEER WANTED

"Engineer" preferably not over 40, for development design and testing of gasfired residential heating equipment. Should have experience with manufacturer of such equipment. Location East, steady employment with well-known manufacturer."

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Obituaries

R. G. Soper

• **Richard G. Soper,** former president of the Dallas Gas Co., and later vice president of Lone Star Gas Co. in charge of the Dallas division of distribution, died from a heart attack at his home in Bethesda, Md., Jan. 31. He retired as Lone Star vice president on Jan. 1, 1944. In 1909, the year before natural gas was turned into the mains in Dallas, Soper went there from Michigan and was appointed secretary of the Dallas Gas Co. In 1928 he was elected vice president and became president in 1933. Upon the reorganization of Lone Star in 1942, the Dallas Gas Co. became a corporate part of Lone Star and Soper was elected a vice president of the enlarged organization.

• **Harvey E. Golden,** who was very recently elected vice president of Florence Stove Co., Gardner, Mass., passed away suddenly late in January, due to a heart attack. Golden, who joined Florence Stove in 1926, was resting in Florida at the time of his death. He started with the firm as manager of the Midwest sales division, became New York division sales manager in 1929, and was general sales manager from 1941 until his election to the vice presidency.

• **Albert C. Roeger,** 54, superintendent of the Lorain division of American Stove Co., and an employee of the company for 40 years, died Jan. 20 at the wheel of his automobile. He was formerly employed by the Dangler branch of the firm, beginning at 14 in the blacksmith and band iron shop. Roeger was transferred to the Lorain division in 1935 as foreman of the tin shop.

• **George G. Sheehan,** Lakewood, Ohio, an executive of the East Ohio Gas Co. for the past 14 years, died suddenly on Jan. 26 from a heart attack. Sheehan had traveled from Cleveland, Ohio, to New Port Richey, Fla., where he planned to spend the winter in an effort to regain his health.

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IF YOU ARE NOT A REGULAR SUBSCRIBER TO GAS

In GAS each month you will find dozens of ideas that will help you know your business better and do your job better. Just one of these ideas coming to you on our pages can pay you many, many times the small cost of a subscription.

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NAME _____ POSITION _____

COMPANY _____

STREET CITY ZONE STATE

Ruud Production Capacity 400% Above Pre-War

Ruud Manufacturing Co.'s President R. H. Lewis, has announced that the recent establishment of new plants has given the company the largest production potential in the organization's 57-year history. Overall production capacity will be 400% greater than that of pre-war years.

In addition to existing facilities in Kalamazoo, Mich., Toronto, Ont., and Pittsburgh, Pa., two new factories, one in Kalamazoo and one in Santa Cruz, Calif., were recently completed. This gives Ruud the world's largest manufacturing network solely devoted to the production of gas water heaters, according to the firm. It was pointed out that actual stepped-up production will be delayed until supplies of raw materials are increased.

Georgia Power Co. Ordered To Reduce Rates

Residential and small commercial consumers of natural gas in Columbus, Ga., were granted savings of $52,000 per year from Feb. 1 in an order issued by the Georgia Public Service Commission. The order requires the Georgia Power Co., distributor in Columbus, to file a rate schedule for residential and commercial service identical with the one recently prescribed for the Atlanta Gas Light Co. It gives a reduction to every consumer paying more than $1 monthly.

Chairman Walter McDonald stated that the reduction will save Georgia Power $43,000 in its annual supply bill, and the commission added an additional reduction of $9000 per year. The monthly saving will be 6 cents on 1000 cu. ft. of gas, 30 cents on 2000 and 60 cents on 3000.

Mid-America Exposition To Be Held In Cleveland

A great cross-section of buyers—industrialists, stylists, engineers, builders, purchasing agents and ultimate consumers—will study new products and materials, time and money-saving processes and machinery at the Mid-America Exposition to be held in the Cleveland Public Auditorium, May 22-31. The region represented, which is bounded by Detroit, Buffalo, Cincinnati and Pittsburgh, produces one-third of the nation's industrial products and serves two-thirds of the nation's people.

16mm Motion Picture Available From A.G.A.

A New Freedom Gas Kitchen, numerous gas ranges built to "CP" standards, and many attractively prepared boiled, broiled, baked and roasted foods are featured in a 20-minute, all sound, full color 16mm motion picture recently prepared by the A.G.A. Promotional Committee. The film is available to high schools and colleges, service clubs, church groups, social organizations or home service demonstrators.

"CED Digest" Issued

Activities of the Committee for Economic Development, New York City, in concentrating on economic research during postwar conversion are described in the first issue of the "CED Digest," published in January. "Looking Forward With CED" is the title of the initial article by Paul G. Hoffman, chairman of the board and president of the Studebaker Corp.

Two CED studies which are nearing completion are a management-labor study on how to make collective bargaining work, and another relating to the problems of small business. They will be described in future issues.

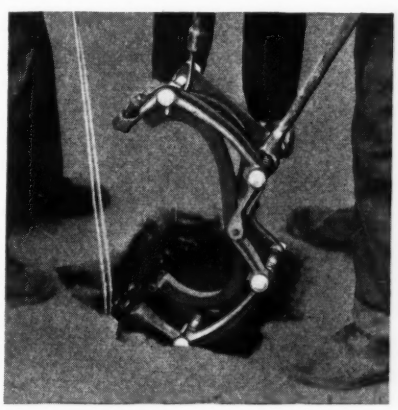
Fire Prevention Meeting Scheduled By Truman

As an initial step in an effort to coordinate a nation-wide program to cope with the fire menace, the President's Conference on Fire Prevention has been scheduled by President Truman for May 6-8 in the Departmental Auditorium, Washington, D. C. Representatives of municipal and state governments, federal agencies, and non-official organizations with an interest in fire prevention have been organized to draft an agenda for the conference and to appoint committees to prepare recommendations. President Truman appointed Major General Philip B. Fleming as general chairman.

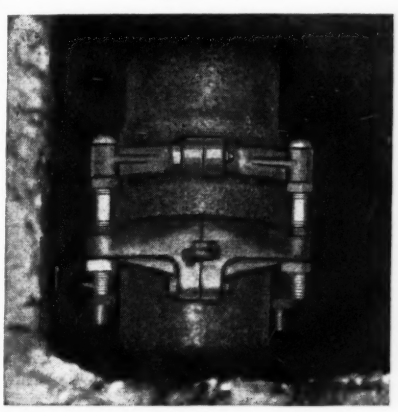
More than 2000 delegates are expected to attend, and it is hoped that a coordinated program will be formulated that will revitalize the national effort to reduce death and financial loss from fire.

NORMAC
BELL JOINT CLAMP

6 inch NORMAC clamp being lowered into hole for installation



6 inch NORMAC clamp in service after installation



Solves Your Joint Repair Problems

- QUICK
- EASY
- PERMANENT

Installed in pavement openings 1′ x 1′. Available in all standard sizes from 3″ to 12″. A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Write for literature illustrating this simple solution to one of the Gas Industries most trying problems and ask for our catalog describing our complete line of

COUPLINGS . . . FITTINGS SERVICE TEES and ELLS SLEEVES . . . COMPRESSION-END COCKS . . . COMPRESSION-END METER BARS

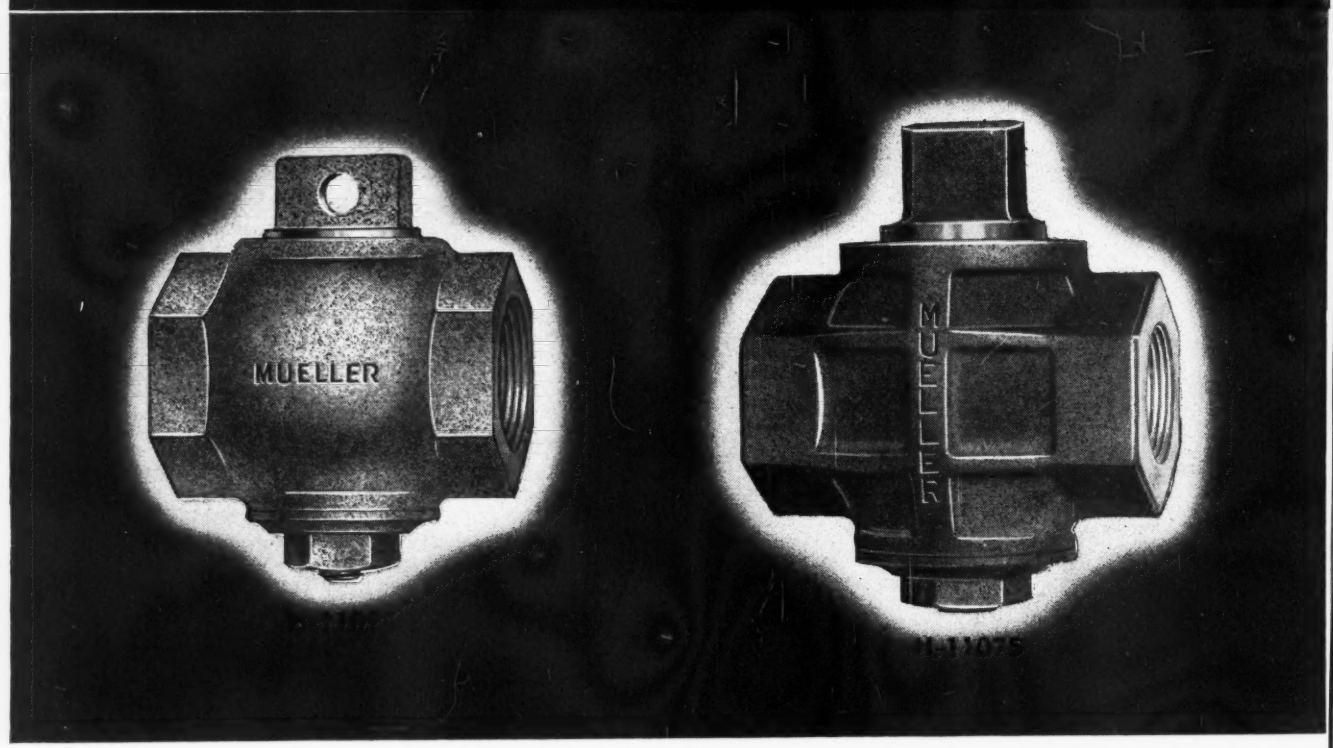
NORTON-McMURRAY MFG. CO.

39 SOUTH LA SALLE ST. ● CHICAGO 3, ILL.

Method and product covered by U. S. Patents, Nos. 2,163,261 and 2,178,286.

STRAIGHT WAY

HIGH PRESSURE GAS STOPS



When the installation calls for a stop to handle the higher pressures, the Mueller H-11074 and the H-11075 Straight Way High Pressure Gas Stops are strongly recommended. These stops are extra rugged in design and construction as they have extremely heavy body walls and thick cast plugs made from high copper content red brass. Manufactured to very close tolerances, each plug is accurately *ground and lapped* into its own individual body in order that they seat tightly yet turn easily against the strongest pressures.

The H-11074 will handle pressures up to 300 lbs. and is furnished in sizes ¾″ to 2″ inclusive.

The H-11075 will handle pressures up to 500 lbs. and is furnished in sizes ¾″ to 2″ inclusive.

Order by number and size.

DEPENDABLE SINCE 1857 FULLY WARRANTED OUR 90th YEAR

MUELLER CO.

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OTHER FACTORIES: *Los Angeles, Cal.; Chattanooga, Tenn.; Sarnia, Ont. Canada*

PIPE LINE NEWS

• Last month the Federal Power Commission received an application from **Michigan Consolidated Gas Co.**, Detroit, for authority to install additional facilities in the Austin and Reed City gas fields near Big Rapids, Mich. Construction cost is estimated at $1,572,450.

The application was filed pursuant to an FPC order of Nov. 30, 1946, which authorized **Michigan - Wisconsin Pipe Line Co.** to construct an interstate line from the Hugoton field to various markets, including several operating districts of Michigan Consolidated in Michigan. Upon completion of its line, Michigan-Wisconsin proposes to lease and subsequently purchase the Austin and Reed City fields from Michigan Consolidated and operate them as gas storage fields as integral parts of the proposed project. Pending completion of such a line, Michigan Consolidated will continue to operate the fields.

• **Tennessee Natural Gas Lines, Inc.**, Chattanooga, Tenn., has applied to the FPC for authority to construct facilities to make natural gas available to the Chattanooga and Knoxville areas. The application stated that the firm has entered into a contract with **Tennessee Gas & Transmission Co.** whereby TGT will supply all of the requirements for the proposed markets. The present plan involves construction of a 181-mile, 16-in. line from TGT's line to Chattanooga, and a 12¾-in., 106-mile line from Chattanooga to Knoxville. From these lines, laterals to serve a number of smaller communities would be constructed.

• **The United Fuel Gas Co.** and **The Ohio Fuel Gas Co.** have requested authority from the FPC to construct a 100-mile, 20-in. transmission line extending from a tap on the line of **Tennessee Gas and Transmission Co.** near Ceredo, W. Va., to Ohio Fuel's Crawford compressor station in Fairfield county, Ohio. Upon completion of the line and other facilities required, the companies state they would be able to deliver an additional 51 MMcf daily to the Crawford station to meet increased demands of Ohio Fuel's present markets. Construction costs to both companies have been estimated at $4,398,620.

• **O. E. Dempsey Construction Co.** is taking charge of the work and supplying the pipe to **J. R. Horrigan Construction Co.** for a 66-mile, 26-in. loop line to be built near Wilson and Garfield, Kan., for **Natural Gas Pipeline Co. of America**. U. G. Ralph, general superintendent of the Dempsey company, will be supervisor of field operations. The project is expected to be under way this month.

• **Memphis Natural Gas Co.**, Memphis, Tenn., has filed with the FPC an application for authority to construct and operate a 1016-mile, 24-in. line extending from the East Texas gas fields to a point about 25 miles south of Pittsburgh, Pa. Construction would cover a three-year period, the initial stage reaching the vicinity of Louisville, Ky.; the second to Clarington, Ohio, and the third to the vicinity of Pittsburgh. Total cost has been estimated at $63,300,000.

A second application, filed jointly by Memphis Natural and **Kentucky Natural Gas Corp.**, requests authority for the Memphis company to acquire and operate the natural gas properties of Kentucky Natural. Purchase consideration was stated as $4,957,488.

• **United Fuel Gas Co.**, Charleston, W. Va., has asked the FPC for authorization to construct and operate additional facilities in West Virginia to increase by about 41 MMcf daily the capacity of its existing facilities for delivery of gas to the Pittsburgh Group of **Columbia Gas & Electric Corp.** Estimated cost is $2,970,000. Plans include construction of approximately 70 miles of 20-in. line in Roane, Calhoun, Gilmer, Doddridge and Wetzel counties, West Virginia.

• The FPC has authorized **Chicago District Pipeline Co.** to construct 11 miles of 24-in. line to complete the looping of its Crawford line extending from the vicinity of Joliet, Ill., to a connection with the facilities of **The Peoples Gas Light and Coke Co.** at the west city limits of Chicago. Cost has been estimated at $750,000.

Chicago District receives gas from **Natural Gas Pipeline Co. of America** at Joliet and supplies it to four distributing utilities in the Chicago metropolitan area. These companies include **Public Service Co. of Northern Illinois, Western United Gas and Electric Co., Northern Indiana Public Service Co.**, and Peoples Gas Light and Coke.

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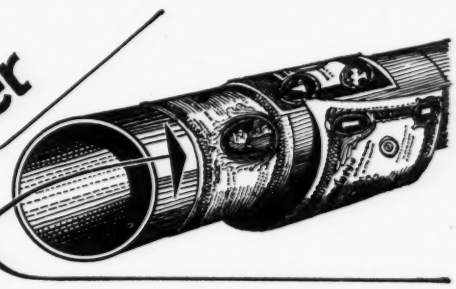

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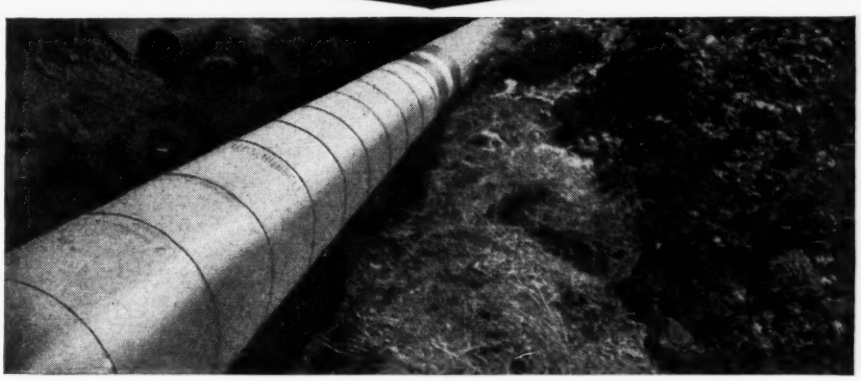

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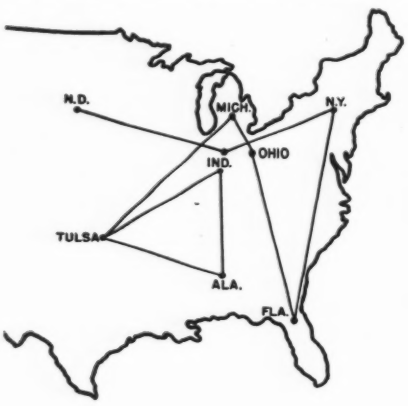
Price Policy Announced By Cooper-Bessemer

In a letter to all suppliers and customers, The Cooper-Bessemer Corp., Mount Vernon, Ohio, and Grove City, Pa., announced establishment of a firm price policy in connection with the sale of diesels, gas engines and compressors and also the purchase of component materials and parts. General Purchasing Agents H. C. Jones and H. L. Winger stated in the communication: "Effective at once, it has been decided by our corporation to adopt the firm price policy in quoting on all of our products for delivery this year. The prices which we will quote from now on will not be subject to any increase above the prices in effect on the date the order is received, except possibly for the prices on major purchased components, which we hope can be held to a minimum. It is our belief that this is the best way to stop the increasing inflationary trend, even though this policy contains certain hazards."

Distribution Record Set By Consolidated Edison

On Feb. 5, when the average temperature was 14° F, Consolidated Edison Co. of New York, Inc., and Westchester Lighting Co. set an all-time record for gas distribution in Manhattan, the Bronx, parts of Queens, and Westchester.

A total of 242,649,000 cu. ft. was sent to customers during the 24-hr. period. The previous record for daily distribution was set on Jan. 22, 1947, when 235,851,000 cu. ft. went to consumers, and the temperature averaged 16° F.



Really . . . WE'RE NOT DOODLING!

What appears to be a rather crude attempt at geometric design, above, is merely an outline of the direct travel line, approximately 10,000 miles, that would have been necessitated by our LPG Peak Load and Standby Engineering and Construction Department in answering CALLS FOR HELP received in December.

IT'S A FLYING JOB

Meeting the demands of gas utilities and industrial plants for plans, engineering advice and estimates for the installation of plants and equipment that will assure them of the ability to meet their fuel requirements is a "flying job"—One in which Time, Speed, and Dependability are of utmost importance.

PEAK-LOAD CAPACITY PLUS PRODUCTION ECONOMY

seem to be the primary reasons prompting these inquiries. Equally as important are PLANNING, DESIGNING and BUILDING "KNOW-HOW."

We, therefore, invite consideration of your problems, without obligation on your part, confident that our years of experience in the fields of LP-Gas Service and Equipment Design and Construction will result in mutual satisfaction and profit.

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Plans Under Way For Gas Processing Plant in France

Purchase of equipment and materials is being made in the United States by Hudson Engineering Corp., of Houston, Texas, for what will be the largest natural gas processing plant ever constructed in Europe, The "Tulsa (Okla.) World" announced in its Feb. 2 issue.

Field construction of the plant, to cost over $2 million, will start this spring in the St. Mercet gas distillate field of southwestern France. The gas field is owned by the French government and operated through Regie Autonome des Petroles, a government-owned company with headquarters in St. Gaudens, Haute Garonne, France.

The new plant will process 60 MMcf of gas per day, extracting from it the heavier hydrocarbons from which five liquid products—propane, butane, motor fuel, naphtha and kerosene—will be produced. The residue gas will be piped to the towns of Pau and Tarbes, where it will be used as industrial fuel and as a base for manufacture of chemicals.

Canning Data Available On Low-Acid Foods

As a result of three years of intensive research, the Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. Department of Agriculture, has obtained new scientific facts on home canning of low-acid foods. A.G.A. has received permission from the bureau to reprint part of the report for distribution to home service departments.

The bulletin, "New Scientific Facts on Home Canning of Low-Acid Foods," contains directions for canning a number of vegetables, as well as a general discussion of the results of the research. It is available from A.G.A. headquarters, 420 Lexington Ave., New York 17.

Fraser Furnace Line Purchased By Rheem

R. S. Rheem, president of Rheem Manufacturing Co., has announced his company's acquisition of the nationally known line of Fraser gas furnaces and winter air conditioners. As of Feb. 1, Rheem purchased from Fraser Furnace Co. its entire gas furnace and appliance business, including patents, designs, trade name, inventories and certain manufacturing equipment.

The Fraser line will be manufactured at the Rheem heating equipment plant at Chicago, and at the Fraser plant at Stockton, Calif., which has been leased.

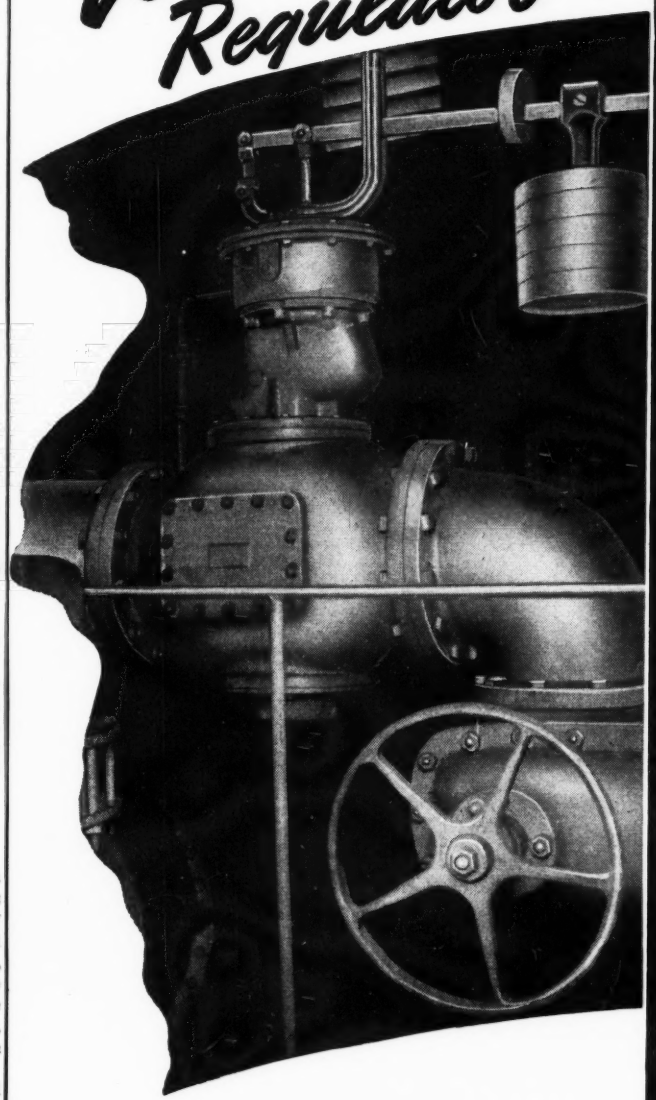
Midget Gas Furnace Has Public Showing

The general public first viewed the suitcase-size Stewart-Warner sealed heat midget furnace at the retail display rooms of Kentucky Electric Appliance Co., Louisville, early last month. The event followed a series of preview showings to architects, builders, engineers and public utilities groups.

Washington Office Moved

The Washington office of E. Holley Poe and Associates has been moved to Suite 705, Century Bldg., 412 Fifth St. N.W., Washington 1, D. C. The telephone number is EXecutive 8576-8577.

Reynolds KT Series Versatile Regulator



★ Reynolds KT Series Versatile Regulator is manufactured in a range of sizes from 2″ to 12″. It will reduce pressure to inches W. C.—or pounds to pounds. This Regulator can be used where space is limited, making it impossible to use the auxiliary bowl. In addition, Reynolds builds High Pressure Line Regulators with auxiliary bowl, when complete lockup is required. Let Reynolds adapt their new Versatile Regulator to your Gas Control System.

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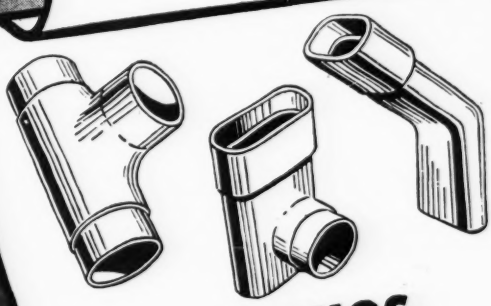
ANDERSON INDIANA U.S.A.

Johns-Manville TRANSITE FLUE PIPE

for domestic gas-burning appliances

EASY TO INSTALL

comes in both round and oval shapes



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City Sues For Validation Of Revenue Certificates

Plant City, Fla., has filed suit in Circuit Court seeking validation of $45,000 worth of revenue certificates to refinance its municipal gas plant operations and improve the plant. In its bill, the municipality said it now has $55,000 worth of outstanding gas plant revenue certificates. The new certificates, which will bear 4% interest, will mature Dec. 1, 1961.

Safety Manual Published

After two and a half years of research and preparation, the National Safety Council has published its new "Accident Prevention Manual for Industrial Operations," a 544-page manual, containing 400 illustrations, charts and tabulations. It is intended as a handy source of accident prevention information for safety directors, safety engineers and foremen. Each of the 14 major divisions of the book is preceded by a summarizing index for quick location of general topics, with a 12-page detailed alphabetical index at the back.

Indiana Supreme Court Says Panhandle Is A Utility

On Feb. 5 the Indiana Supreme Court ruled that the Indiana Public Service Commission has jurisdiction over direct sales of natural gas by Panhandle Eastern Pipe Line Co. to state industrial plants. The ruling reversed a Randolph Circuit Court decision ordering Panhandle to file a schedule of rates for gas sold to Anchor-Hocking Glass Co., Winchester, Ind. Panhandle contended that its sale of gas to Anchor-Hocking was in interstate commerce and not subject to Indiana State control, in its appeal to the supreme court to have the lower court ruling set aside.

In his opinion on the case, Judge Howard S. Young pointed out that unless Indiana regulates the sale of gas directly to industrial consumers, it will not be regulated. He further held that Panhandle is a utility within the meaning of Indiana law, since it sells indirectly to the public.

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The clock has been engineered to insure accurate operation under all field conditions. The case, made in two parts, is joined and hermetically sealed as a projection against destructive elements. Pinions are machine cut and splined to their gears. More than ample power is provided by an extra heavy main spring. Light balance wheel is set in jewel bearings.
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The Arcco Macnick Chart Clock runs eight days with one winding, the chart hub arbor turning once in 24 hours. Interchangeable converter gears effect one turn of the chart in 2, 3, 4, 6, 8, 12 or 24 hours or in 2, 3 or 7 days. Standardize on Arcco Macnick and reduce your clock inventories. Many thousands now in use. Price $10.50 fob Los Angeles or Tulsa.
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Robertshaw Simplifies Corporate Structure

John A. Robertshaw, president, Robertshaw Thermostat Co., Youngwood, Pa., announced recently that as of Jan. 1, 1947, the company's subsidiaries with separate corporate structures — American Thermometer Co. of St. Louis, Mo.; Grayson Heat Control Co., Ltd., of Lynwood, Calif.; and Paragon Manufacturing Co. of Scottsdale, Pa.—have merged with the parent company. Hereafter, American Thermometer Co. will be known as American Thermometer Division, Robertshaw Thermostat Co.; Grayson Heat Control, Ltd., as Grayson Controls Division, Robertshaw Thermostat Co.; and Paragon Manufacturing Co. has been completely absorbed.

Robertshaw stated that the new structure permits a complete interchange of processes, engineering, models and ideas.

Memphis Natural Withdraws Proposed Rate Increase

Memphis Natural Gas Co. has withdrawn rate schedules filed with the Federal Power Commission which would have increased the interstate rates for gas delivered to Arkansas Power & Light Co., Mississippi Power & Light Co., West Tennessee Gas Co., and Memphis Light Gas & Water Division by approximately $240,000 annually. Protests against the proposed increase had been made by the Memphis Division and Mississippi Power & Light, and West Tennessee told the FPC such an increase would necessitate a boost in rates and charges to its customers.

The rate schedule was suspended by FPC on Nov. 27, pending hearing to determine if the increase was justified.

Brochure Tells Story Of Gas-Fired Incinerator

"Product, Plan and Profit" is the title of a comprehensive new brochure recently released by the Incineration Division of Bowser, Inc., manufacturer of the gas-fired Incinor. Available to gas companies, dealers, and distributors, the booklet tells concisely the story of the product, the merchandising plan behind it, and points out the profit opportunities which the residential incinerator market offers. A copy may be obtained by writing to Bowser, Inc., 647 W. Virginia St., Milwaukee 4, Wis.

Lone Star Wins Franchise

On the third and final reading late in January, the Wichita Falls city council granted Lone Star Gas Co., Dallas, a 20-year franchise. This is the first franchise Lone Star has had in Wichita Falls in 12 years.

"Miss Flame" Narrates A.G.A. Promotion Story

"History of Gas," a picture story book designed to tell the story of gas to school children, was scheduled for publication this month by the Promotional Committee of the A.G.A. Narrator will be "Miss Flame," a new industry character symbolizing gas as the modern, quick and efficient servant, with particular emphasis on domestic uses. The character will be made available for use by all gas companies in the near future.

One million copies of "History of Gas" have been ordered, and although the book has been prepared primarily for children, a recent survey indicates that adult readership of picture story books is surprisingly high and that books which are read by children will probably also be read by their parents.

When the books are off the press, samples will be mailed to all gas companies, together with price information and suggestions for distribution.

"America Cooks" Presented At Home Service Workshop

Home service executives attending the A.G.A. Home Service Workshop in Cincinnati on Jan. 20 were the first to examine the recipe book, "America Cooks," latest promotional piece of Hardwick Stove Co., Cleveland, Tenn. Each purchaser of a deluxe model Hardwick range can secure a copy of the book without cost by returning the post card in the oven of the range.

Several Hardwick merchandising organizations are planning special sales promotions built around the book. It is an attractive collection of outstanding American recipes, divided by geographic sections of the United States, and illustrated by Pony Proehl. All recipes were tested in Hardwick's testing kitchen.

St. Petersburg Gas Plant To Be Modernized

Permits totaling $74,614 have been issued by the city of St. Petersburg, Fla., for construction at the city gas plant. This includes miscellaneous foundations for a pump house and sub station, two steel tanks, and an outside pipe line from the tanks.

This is a small portion of the approximate $950,000 to be spent in modernizing, repairing, and increasing capacity and facilities of the plant. Public Utilities Director Alex Speer estimates that the construction will be completed by the end of 1947.

December Gas Sales Rise

Total sales of gas to ultimate consumers, excluding sales to other utilities, in December, 1946, were 7% ahead of a year earlier, the American Gas Association reports. December was the sixth consecutive month in which gas sales registered a gain over 1945, and the increase was due almost entirely to new customers and to sales other than house heating for former customers, since the degree days in December were approximately 21% lower than a year ago. The Association's index of gas sales on Dec. 31, 1946, stood at 182.1% of the 1935-1939 average. For the 12 months ended Dec. 31, 1946, total gas sales were 8% ahead of a year ago.

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"ELNO" eliminates the need for expensive non-ferrous or specially-processed tanks even where water is so highly-corrosive that such tanks have always been considered essential. It is not like some chemical "rust inhibitors" which merely bleach discolored water and do little or nothing to prevent rust or protect the tank. "ELNO" really routs rust, requires no attention, and causes no further expense after installation.

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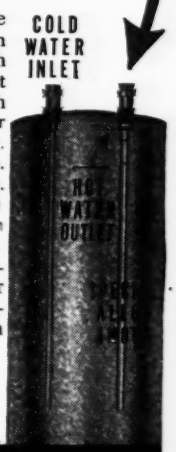

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To get top efficiency in gas-purification at the lowest cost, use Connelly Iron Sponge. It's the finest purification material to be had.

Connelly Valves, Governors, and Manometers are now manufactured and sold only by Norwalk Valve Co., South Norwalk, Connecticut. Connelly will, however, continue to manufacture and sell Gas Purification Equipment including Connelly Iron Sponge, pH Kits, Caloroptics, and BTU Control equipment in connection with propane and butane.

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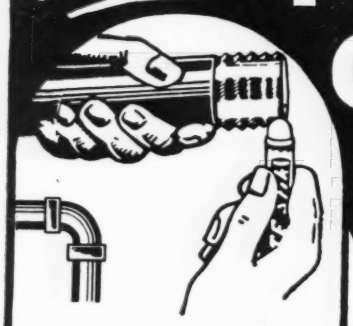

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Just rub 3 or more strokes across pipe threads. It spreads and fills threads when turned.

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Always Ready For Instant Use

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WON'T DRY OUT

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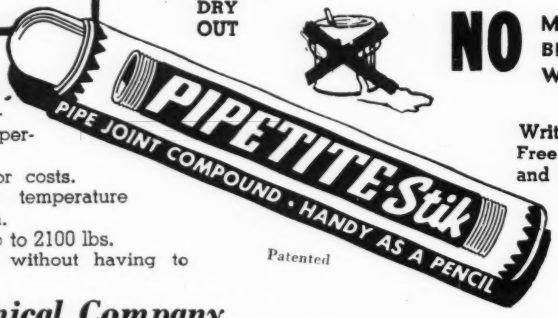

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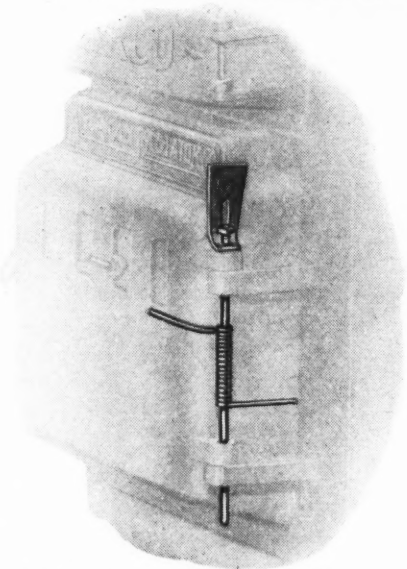
The Inland Door Closer

DESIGNED for CONVERSION BURNERS

OVER 50,000 IN USE



This device, designed for conversion burners, automaticallly closes the fire door of a boiler or furnace when blown open.

It consists of a cadmium plated door hinge pin, spring and wedge. The hinge pin replaces the regular fire door pins, the spring furnishes the motive power and the slotted wedge holds the fire door in the open position when required.

Furnished in 3/16 — 1/4 — 5/16 — 3/8" Sizes

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Catalogs

• **Mine Safety Appliances Co., Pittsburgh 8, Pa.**—Bulletin EB-5 contains complete information, including construction and operation details and industrial applications, on MSA hose masks and auxiliary equipment. Six pages, illustrated. Bulletin DR-3 describes the carbon monoxide alarm, designed for efficient protection against dangerous concentrations of carbon monoxide in the air—around blast furnaces, in steel mills, chemical plants, public garages, and for bus and truck fleet operators.

• **Davey Compressor Co., Kent, Ohio**—Bulletin 108A describes seven models of heavy duty take-offs and is published by the truck equipment division. The bulletin lists take-off operating principles, gives installation data and complete specifications. Emphasis is placed upon Davey's internal and external gear drive design. This operates as a strong and durable spline. Also described are various types of truck-mounted power equipment which can be driven advantageously through take-offs.

• **Surface Combustion Corp., Toledo 1, Ohio** — Tempering in Surface Combustion standard rated furnaces is described in bulletin No. SC-133. The four-page folder discusses different types of furnaces recommended for tempering of various kinds and shapes of ferrous objects. Heat flow in forced convection furnaces and the principle of Conjecto-Firing are illustrated by cutaway drawings. A table giving the effects of tempering temperatures on hardness is included.

• **Dow Corning Corp., Midland, Mich.**—This firm has published the third edition of the catalog "Dow Corning Silicones, New Engineering Materials." The 11-page, two-color booklet lists all of the silicone products now available and contains many charts and graphs, describing the unusual properties of this rapidly increasing family of organo-silicon-oxide polymers.

• **Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y.**—1947 Catalog. It includes the latest books on chemistry, technology, physics, general science, mathematics, engineering, foods, formularies, drugs and cosmetics, medicine, metals, technical dictionaries, etc. Lists date of publication of each book, price, number of pages, description and full table of contents.

• **Worthington Pump and Machinery Corp., Harrison, N. J.**—Type CG acid and alkali resistant pumps in Worthite, a stainless steel resistant to a wide range of corrosive conditions, are the topic of Bulletin W-350-B1H. The 20-page illustrated booklet covers specifications, applications, sectional diagrams, performance curves, etc.

• **Accuracy Scientific Instrument Co., Philadelphia, Pa.**—Bulletin 55 describes the Senior Midget, a separable socket industrial thermometer. This product eliminates the necessity of returning the thermometer to the factory for repair and makes it possible for the maintenance man to insert a new refill stem in a few minutes.